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LOS ANGELES, CAL., DECEMBER 1, 1896

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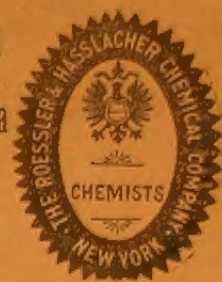
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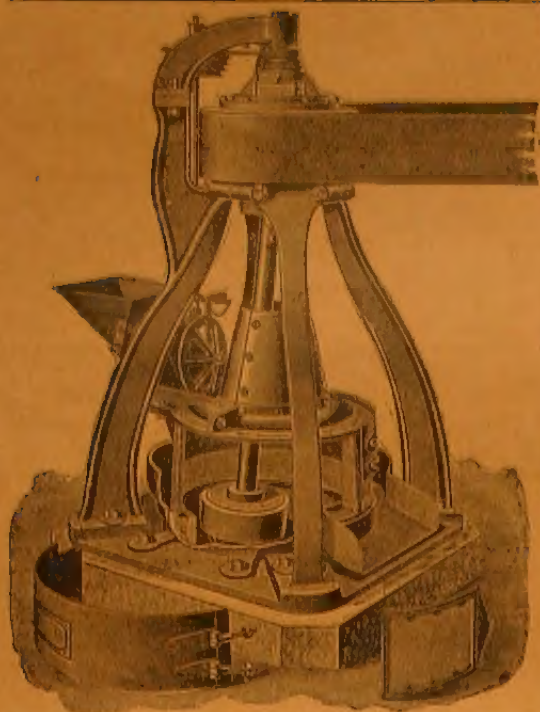
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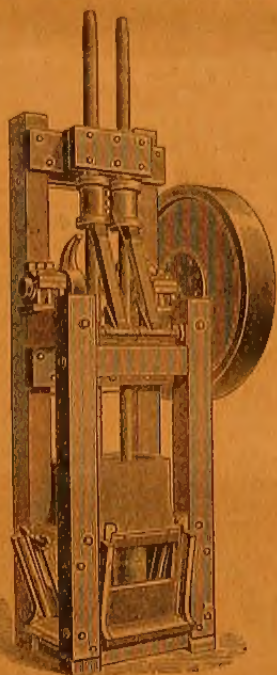
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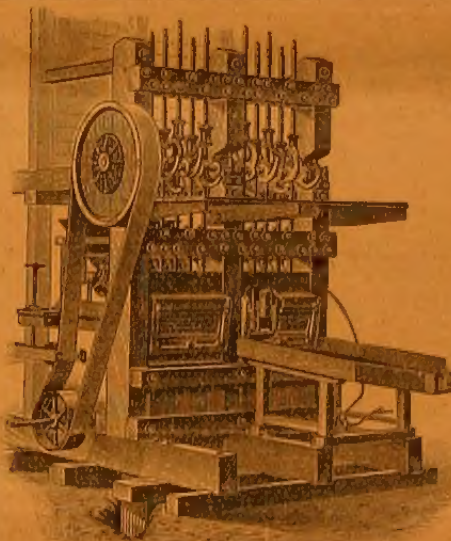
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SALT LAKE CITY A MINING CENTER.

There are many requisites necessary to make a successful mining center. Thriving cities have been started in the west, on the supposition that the mineral resources were of sufficient magnitude to not only sustain them, but to make them great in population and commercial importance; but the vicissitudes of the industry have been such that but few important cities have been entirely sustained in their growth by the mining industry.

Salt Lake City, probably more than any other city in the United States owes its present prosperity and its promising future to mining, aside from its favorable location in the center of one of the richest valleys in the United States, it is surrounded by a mineral belt which present development is proving to be one of the most extensive in the world. But other things are necessary to make this vast treasure available for the uses of mankind. These immense deposits of mineral have probably existed thousands of years, but were useless to within a few years ago, on account of the want of a process to extract the precious metals economically. The fame of Utah has attracted mining men from all parts of the world, and there are now to be found in Salt Lake City many business institutions and mining men to whom the credit is due of having overcome all the apparently insurmountable difficulties of winning the values from the hitherto useless deposits of mineral.

To attempt a description of all the firms in Salt Lake City who cater to the mining trade would be beyond our power, as almost every business house in the city has more or less relations with the miners, but we will attempt to describe those that depend almost entirely upon the success of the mines for their business :

The Salt Lake Stock and Mining Exchange, one of the important factors in the transaction of mining business, was estab-

lished in 1894. They have thirty dividend-paying mines on the board, all of which are in Utah, and a number of prospects. There is a daily call, and among the members are most of the prominent business men of the town, including bankers, merchants, professional men and capitalists. All the stocks are largely dealt in, and, as some of them pay regular monthly dividends, they are sought after as a permanent investment by many. There are also about twenty non-listed stocks which are traded in extensively, some of them commanding as much attention as the listed ones.

Among the business houses that are prominently identified with mining can be mentioned the Nelden Judson Drug Co. This firm, which succeeded the Roberts & Nelden Drug Co. in 1891, deal in all kinds of assaying and chemical goods. In their large stock can be found everything necessary to fit up a complete assay office and chemical laboratory. They are agents for the Roessler & Hasslacher Chemical Co., of New York, for the Becker Bros. and Troemner's assay balances, which are well known throughout all the mining countries. They also do a large business in cyanide of potassium and blue stone. A new department has been recently added to the business, which is of great importance to Salt Lake City and the west in general, it is the manufacturing of balances of precision, and is known as the Keller Balance Manufacturing Co. They have fitted up an entire floor of their large building with machinery for the manufacturing of balances. This is something that has never been attempted in the far west, and the enterprise of the firm in starting so important an industry is being thoroughly appreciated, from the fact that they have not been able to fill one half of the orders that have been received. The balance they are making has been put to the most thorough tests, and has been pronounced by the severest critics to be one of the most delicate and accurate ever manufactured in this country or Europe. Mr. G. P. Keller, who personally superintends the manufacturing, has the reputation of being one of the best mechanics in the west, and will not allow a balance to leave the house until he has exhaustively examined every detail of the work. The trade of Nelden Judson extends over all the west, and is growing as the mining industry with which it is so closely connected grows.

The foundries of Salt Lake City would be a credit to any place. They have kept pace with the development of the country, and naturally feel the interest that is being taken in mining. The first we visited was Silver Brothers' machine shop and foundry, the oldest in the city, having been established by Wm. J. Silver, the father of the present proprietors, in 1866. We were shown a picture of the original building that was erected, which covered twelve feet square. In this building Wm. Silver built the first steam engine built in Utah, in 1879. The business was moved to the present location, where a structure, that was considered pretentious in those days was erected, it covered 30x60. This has been enlarged until, at the present time the Silver Brothers have the most extensive machine shops and foundries in Utah. They employ upwards of fifty men, and are prepared to build anything that is required for the mines. They manufacture all kinds of mining, milling and pumping machinery, and have equipped some of the largest mining plants in Idaho, Nevada and Utah. They have now in course of construction six very

heavy stamp batteries for Austin, Nevada, and the castings are certainly as good as can be turned out anywhere. The Messrs. Silver are making a specialty of good work, and are thoroughly familiar with all the requirements of the miners, having lived in their midst and been brought up in the foundry and machine business.

One block northwest of the Silver Bros. is located the Davis, Howe & Co. machine shop and foundry. This firm are also old timers in Salt Lake City, where they established themselves in 1872. We were shown through the works by Mr. Howe, and found an appearance of activity that argues well for the reputation of the firm. We were informed that their trade extended to Idaho, Nevada and Utah, and that although they, in common with all Salt Lake City, felt the low price of silver and lead, that the outlook was very favorable for the coming year.

The smelters, of which there are three, have contributed in no small measure to the successful operation of the low grade mines in Utah. The Germania Lead Works, located at Germania, six miles from Salt Lake City, is the oldest as well as the largest smelter in Utah. When we visited it, we found Mr. J H Tucker, formerly of the Globe Smelting and Refining Co., of Denver, in charge. The plant is modern in every way, and compares very favorably with any of the Colorado smelters. At present, four stacks are in operation, one of them being of 225 tons capacity, four reverberatory roasters, one Keller-Cole patent roaster and ten Bruckner roasters, together with the copper smelter, complete the plant. Six of the ten Bruckner furnaces have just been installed by the Denver Engineering Works, the well-known Denver machinery house. The establishment of the Germania dates back to 1873. It is very favorably located on the Rio Grande and Western and Union Pacific railroads, and receives shipments of ore from all parts of Idaho, Nevada, Colorado and Utah. We found the actual work being performed at the smelter to be 600 tons every twenty-four hours. There are 425 men on the pay roll. J. R. Jones, with head quarters in Salt Lake City, is the manager.

One mile nearer Salt Lake City than the Germania is located the Hananer Smelting Works, which was established in 1882. They are operating three stacks with a capacity of 50 tons each, besides five reverberatory roasters. They have in use one of the Ropp Straight-line furnaces, which have been so successful wherever used. This furnace is the most economical in existence, requiring very little power. Figures have been received from the Selby Smelt and Lead Company in San Francisco, showing that they roasted ores of iron pyrites for 90 cents per ton, in the Ropp Straight-line furnace in their works, which is only 105 feet long and 19 feet wide—the cost of roasting is considerably less per ton in the 150 foot furnaces. All the bullion from the Hananer smelter is shipped to the Omaha and Grant Smelting Co., at Omaha. 120 men are regularly employed. Most of the ore received is from Tintic, Bingham, Park City and other Utah points. R. H. Terhune is superintendent at the smelter, Mr. A. Hananer is general manager. The offices of the Company are in the McCormick Bank, Salt Lake City.

Twelve miles south of Salt Lake City, at Sandy, is located the Pennsylvania Smelting Company. They have seven stacks, two of which are 100 tons capacity. They treat mainly gold, silver and lead ores, and employ

250 men. Six reverberatory and five Bruckner furnaces do the roasting. Most of the tonnage smelted comes from Idaho, Montana, Nevada and Utah. Mr. F. H. Officer is the general manager of the Pennsylvania Smelting Company, which is owned by the Pennsylvania Smelting Company, of Pittsburg, Penn.

We find Salt Lake City well supplied with machinery houses and agencies for large eastern houses.

The old reliable firm of Fraser & Chalmers, with works at Chicago, have an agency in Salt Lake, in charge of Mr. J. W. Young, who has represented the company in Utah and Montana for eight years. They are so well known that it is needless to mention that they handle everything in the way of mining, milling, pumping, smelting and concentrating machinery, and have equipped the largest mills in the west—among others, the Bullion and Beck, Sioux Mill, Eureka Hill Mill, Mammoth Mining Company Mill, and Horn Silver Mill. They have just put in Riedler air compressors for the Centennial Eureka Company. Their trade extends to all parts of the world. The agency in Salt Lake City has been established since 1886.

The Colorado Iron Works have also realized the importance of Utah as a market for their goods, and are represented in Salt Lake City by Mr. A. Grant, an experienced machinery man. The Company have been favored with a liberal patronage, and include in the recent list of plants installed, the Cammora Gold Mining Company gold mill, which is near Albion, Idaho. They also put in the April Fool gold mill and cyanide plant at De Lamar, Nevada. Their trade extends wherever there is mining or milling going on.

In the Knutsford Hotel building is located L. C. Trent & Co., who deal in all kinds of machinery for mining purposes. This firm have put in several large smelting plants in Arizona, including work at the United Verde Company of Jerome, Arizona, the Detroit Copper Company of Morenci, Arizona, and others. They installed the 100-ton concentrating plant for the Cactus Mining Company of Frisco, Utah, and are now putting in a 50-ton concentrating plant at Basin, Montana. The Brick Consolidated Mining Company of Vanderbilt, California, purchased their duplex air compressor drills, pumping plant and four vanners, also the pipe for their pipe line, from L. C. Trent & Co. Their trade is extensive through the west and is gradually extending into the southern country.

Another Denver house, which has energetically been competing for western business, has recently established an agency in the Utah capital, and, in selecting Mr. J. A. Yeatman for their agent, evinced good judgment, as he has been in Salt Lake for several years, and formerly represented the well-known firm of Edward P. Allis Company of Milwaukee. Mr. Yeatman is a mechanical engineer, and has been very successful in obtaining contracts for the companies he has represented. He has a new electrolytic cyanide process, which he is working on and expects to introduce in the near future. The F. M. Davis Iron Works Company of Denver, who are represented by Mr. Yeatman, are known all over the west and have a large and growing trade.

Among the engineers and contractors, none are better known than Jones & Jacobs, but they have found it profitable to combine other lines with their regular business, and are now representing Washburn & Moen Manufacturing Co., H. R. Worthington, Norwalk

Air Compressor Co., Rarig Engineering Co. of Columbus, Ohio, and others. They have been established in Salt Lake City since 1883, and their name is connected with some of the important business enterprises of Utah. They constructed the Pleasant Valley Coal Company's plant at Diamondville, the 1st Centennial Eureka Mill, the Horn Silver Smelter at Murray, and did a large part of the work on the Hananer Smelter. They do constructing of all kinds in connection with mining, milling, smelting or cyanide work.

We were surprised to find, in spite of the large business that is done by eastern machinery houses, that Salt Lake City is well supplied right at home with large stocks of everything necessary to conduct any kind of a mining or milling enterprise.

In looking over the extensive warehouse of the Utah and Montana Machinery Company, we were surprised at the stock that is constantly kept on hand. This house has been doing business since 1883 and was incorporated two years later. They are agents for Knowles & Blake pumps, Ingersoll Sergeant rock drills and compressors, Westinghouse Machine Co., and Westinghouse Electric Co., Hazzard wire rope, Clinton wire cloth, Pemberty Injector, Safety Nitro powder, Truax patent Automatic Ore Cars, J. H. Montgomery Machinery Co., Crescent Steel Co., Erie City boiler and engine, Ottumwa Iron Works, M. C. Bullock Manufacturing Co., Reeves wood split pulleys and magnesia sectional pipe covering. They also handle oils of all kinds and heavy hardware for mining purposes. They do a very large trade through all the mining camps in the west.

Besides the three smelters we have mentioned there are three sampling works in constant operation, with general offices in Salt Lake City.

Taylor & Brunton, the well-known Denver firm, have a mill at Palace Station mine, and one and half-miles from Salt Lake City, they have just finished putting in one of the Taylor & Brunton improved automatic samplers. Most of their work is custom sampling. They also do a large business with ore shippers, sending consignments east, the idea being to get a check on the smelters. Mr. James W. Neill, an experienced mining engineer and metallurgist has charge of the affairs of the Company.

The Pioneer Sampling Mill is owned and operated by Mr. R. Mackintosh, a man who has devoted his life to mining pursuits. He has two sampling mills, one being at Sandy, 12 miles from Salt Lake City, and the other at Park City, Utah. He employs 25 men at the Sandy sampler, and has a capacity of five hundred tons per day; in Park City he employs 30 men—both mills use automatic machinery entirely. The business is public sampling and selling ore on the open market. He receives consignments of ore from Nevada and all parts of Utah.

Located between 8th and 9th South streets, on 4th West, in Salt Lake City, is the Conklin Sampling Works, they have lately doubled their capacity and put in all new machinery and engines. They now have a daily capacity of 600 tons. All their assaying is done by custom assayers. They employ 40 men and their business extends through Montana, Nevada Idaho and Utah. Mr. C. B. Markland is general manager, with offices in the Atlas Block, Salt Lake City.

Business in past years has been of such a general character in Salt Lake City that several general stores have grown up that would

be considered large in any city. The first one we visited was Cunningham Company, which is ably conducted by Samuel H. Hill. Although our paper has considerable space, we would not care to jeopardize it by attempting to describe the different lines handled by Cunningham Company. They have the agency of the Giant Powder Works, the Gutta Percha and Rubber Manufacturing Co., and W. T. Garratt & Co. pumping and hydraulic mining machinery. The house was established in 1870, and enjoys the patronage of the miners through eastern Nevada, western Colorado, southern Idaho, northern Arizona, Wyoming and Utah. They make a specialty of miners' trade, and carry everything in the way of provisions, hardware and mining supplies.

Geo. M. Scott & Co., although better known as hardware and metal merchants, do a large share of the mining business that comes to Salt Lake City. They deal in miners' hardware, mining machinery of all kinds, engines, boilers, pumps, oils, etc. They have the agency of the California Powder Works, John A. Roblings Sons, Henry R. Worthington pump, the Dodge wooden pulley and many other lines in connection with mining. They were established in 1870 under the name of Scott, Dunham & Co. They find a market in Oregon, Nevada, Wyoming, Idaho, Colorado and Utah.

Another house which carries a stock of miners' goods is the Salt Lake Hardware Co. They have been in business nearly ten years and have several valuable agencies, including Canton Steel Co., Hazard Powder Co., Tubbs Cordage Co., Howe's Scales, Washburn & Moen M'fg Co., H. M. Myers shovels, Sydney Steel Scraper Co., and Frictionless and Magnolia Metal Cos. They realize the importance of the mining trade and are working up a large business through the camps of Idaho, Wyoming, Nevada, Montana and Utah, and with the completion of the railroad to Los Angeles, expect to extend their trade to California and Arizona.

The large increase in the use of the Cyanide process to work Utah ores has induced F. E. Schoppe & Co. to make a specialty of zinc and zinc shavings and cyanide leaching tanks and zinc troughs. The firm was established nearly twenty years ago. They also make air pipe for mines and have equipped some of the big mines of the west. Their business in zinc shavings extends all over the west and northwest.

The interests of the smelters further east of Utah are well represented in Salt Lake City. Ness, Bamberger & McMillan represent the Philadelphia Smelting and Refining Co., one of the largest institutions of the kind in the world. They informed us that they had secured many good contracts for their Company through Idaho, Nevada and Utah. Scott & Anderson represent the interests of the Chicago and Aurora Smelting and Refining Co., and the Selby Smelting and Lead Co. They buy ore from the different sampling works on commission for their representatives. We met Mr. J. E. Jackson, the agent of the Consolidated Kansas City Smelting and Refining Co. on his return from the north, where, he assured us, he had closed some very large contracts for his smelter. The Colorado Smelting Co. have Mr. F. W. Billings to look after their interests. Mr. Billings is one of the heaviest stockholders in the Germania Lead Works, and has been in Salt Lake City since 1873. He is one of the largest shippers of ore going east and north. Mr. T. R. Jones represents the Globe Smelting and Re-

fining Co. and Mr. A. Hananer the Omaha and Grant. The Pueblo Smelting and Refining Co. of Pueblo, Colo., receive a large tonnage from all the sampling works and from the miners direct. It is a smelter which has the confidence of all the miners.

Last, but by no means least, we come to the assayers. There is probably no city in this country or any other that has such a number of competent assayers—Salt Lake City has drawn the best from all directions. The Union Assay Office, under the management of Mr. M. S. Hananer, was established in 1887. A general assaying business is done together with most of the analytical work for the smelters. Mr. C. H. Sanders, who was formerly chemist for the Iron Belt Mining Co. of Michigan, has a well equipped office, and makes a specialty of analytical work. One of the most complete offices in the west is found at 169 Southwest Temple street, and is that of R. H. Officer & Co. This firm have a five-horse-power electric plant which runs the sampling mill they have in their office. They are prepared to make mill tests to determine best process to work ores by, and can handle large samples. Their business extends to Colorado, Wyoming, Montana, Nevada, Utah and Idaho. One of the oldest established assayers in the city is W. A. Hodges, he does work for many of the large mining companies and for the sampling works. He has been in Salt Lake City since 1878. J. W. Currie has a well equipped office at 159 Main street. He has been in the assaying business at his present location for ten years, and an assayer for seventeen years. He was formerly in the Sawtooth Mining district in Idaho. The Miners' Assay Office is ably managed by Mr. Louis Seckels, who was attracted from Butte City, Montana. He informed us that his business was such that he had never regretted the change. He does a general assaying business and thoroughly understands his work. We found Leadville represented by J. H. Korty & Co., who have been in Salt Lake several years. We knew Mr. Korty twelve years ago in Leadville, where he was considered one of the reliable assayers of that great mining camp, and when an assayer gains a good reputation in Colorado he can work in any country. F. M. Bishop, the last assayer we visited has been in business in Utah's Capitol for many years and is well and favorably known by all the miners. He has the reputation of being a very careful and accurate man. He informed us the outlook was good for the coming year.

Only lack of space prevents us from speaking of many more things that go to make Salt Lake City one of the greatest mining centers in the United States. Over one hundred mining companies have their offices here and there are a number of reliable mining brokers and mining engineers who operate from this point.

There are two large daily papers, the *Herald* and *Tribune* and one excellent mining journal the *Inter-Mountain Mining Review*, edited by Mr. Alex. Hyslop, which has a wide circulation all through the west. There are also several weekly papers.

Utah is entering upon a new era and it is easy to foretell that by the time the state is ten years old it will be one of the most attractive for capital, as it is now one of the richest in the west.

The Territory was organized September 1850, and the first state officers elected in November, 1895. The present population of Utah is nearly 300,000. The Capitol, Salt Lake City, has a population of 55,000.

We add a few statistics to show that the increase in the mineral output has been steadily growing in spite of the low price of silver and lead, which probably injures Utah as much as any other state in the Union.

GOLD AND SILVER PRODUCT FROM 1879.

YEAR.	GOLD.	SILVER, OUNCES.
1880.....	\$ 165,773	3,783,506
1881.....	164,500	5,400,191
1882.....	186,926	5,435,444
1883.....	144,513	4,531,763
1884.....	119,305	5,669,488
1885.....	184,024	5,972,689
1886.....	218,626	5,918,842
1887.....	235,369	6,161,737
1888.....	287,022	6,178,855
1889.....	516,232	7,147,651
1890.....	699,700	8,165,586
1891.....	749,427	8,015,223
1892.....	788,521	8,967,656
1893.....	1,117,668	7,107,503
1894.....	1,127,961	6,534,182
1895.....	1,546,529	8,141,383

PRODUCT BY COUNTIES, 1895.

COUNTIES.	GOLD.	SILVER, OUNCES.
Summit.....	\$ 85,429	3,204,004
Juab.....	568,941	3,517,166
Salt Lake.....	229,850	775,640
Tooele.....	605,631	121,071
Beaver.....	14,717	507,500
Millard.....	27,491	900
Washington.....	10,102
Other Counties.....	14,469	5,000

SOME DIVIDEND-PAYING MINES.

NAMES.	NO. OF SHARES.	PAR VALUE.	DIVIDENDS.
Ajax.....	300,000	\$ 10.00	\$1,000,000
Bullion-Beck..	100,000	10.00	2,165,000
Cent.-Eureka..	30,000	50.00	1,890,000
Crescent.....	600,000	25.00	280,000
Dalton&Lark..	2,500,000	1.00	75,000
Daly.....	150,000	20.00	2,887,500
Eureka Hill..	10,000	100.00	1,450,000
Galena.....	100,000	10.00	61,000
Gemini.....	5,000	100.00	600,000
Horn Silver...	400,000	25.00	5,080,000
Mammoth.....	400,000	25.00	1,100,000
Maxfield.....	300,000	10.00	117,000
Mercur.....	200,000	25.00	525,000
Ontario.....	150,000	100.00	13,325,000
Silver King...	150,000	20.00	825,000
Utah.....	100,000	1.00	164,000

NOTE.—Many companies, like Marion, at Mercur, when the shares are closely held, do not make known what is paid stockholders, otherwise this list could be largely augmented.

We sincerely hope the next time we visit Salt Lake City to come over the Salt Lake City and Los Angeles Railroad and to see all the great wealth that exists between these two growing metropolises, utilized for the benefit of both places. And we are sure that a trip from the glorious snow-clad mountains of Utah to the sea coast at Los Angeles will convince anyone that the building of a road to connect the two cities is the most important matter we have before us for the coming year, and we hope the capitalists of both places will get together and build the short piece of road that will be necessary. From Milford to Manvel is about three hundred miles, and a great part of the distance is over country where the expense of grading would be light. Estimates recently furnished by E. M. Le Prohon show that the first 115 miles south of Milford can be graded for \$375 per mile. The trip across the country is one that few care to undertake. By rail it now takes about sixty hours, but with the direct line built the trip can be made in fifteen hours. Salt Lake City and Los Angeles will be equal-

ly benefitted, and next spring should see active operations commenced and continued until the gap that now separates us is closed.

LOCATION OF THE HARBOR.

The dispatches announce that the Commission of Engineers appointed by the President to locate the harbor for Los Angeles will leave Washington for this Coast on the 9th instant. That body will decide whether the harbor shall be at San Pedro or Santa Monica. The contest over the location has been spirited and not altogether devoid of bad feeling. Any manifestation of such feeling now will have no weight with the Commission, and vituperation by or of one side or the other will only make a bad impression touching the character of our people. The location will be settled upon merits, for the Commission is disinterested and impartial.

Each side should present its case fully, and all efforts to give the Commission light will be welcomed. The question is chiefly engineering and commercial, the harbor is not to be built to merely accommodate San Pedro or Santa Monica, but to subserve the interests of all Southern California, and more especially the large and growing city of Los Angeles. To locate it at one place or the other will not be a disaster to this city. Either will fairly accommodate its commerce. To build a harbor at either place is not impracticable from an engineering standpoint, and the sum of money to be expended is the same in either case according to the provisions of the Act of Congress. The Naval members of the Commission will determine at which place the harbor can be most easily defended, and the commercial superiority of either place will be settled by the testimony of commercial men and ship owners.

Let every effort be made to give the Commission all the information attainable unaffected by local or personal interests. It is to the common interest that there should be the best solution of the question possible.

Electric Hardening of Steel.

A French electrical journal announces a new invention in the field of electrical metallurgy. It is a process which gives an extraordinary hardness to steel. It is reported that the inventor, a Mr. Taux, has executed the following experiments before a committee of engineers at Strausburg. A drill, hardened by electricity, pierced a shell twice as quick as a drill of the best steel hardened in the usual way. The drill was closely examined afterwards by means of a strong microscope, and not the least injury could be discovered. An electrically hardened circular saw cut iron bars with surprising ease. With a cold chisel, similarly treated, a steel bar $1 \times 1\frac{1}{2}$ inches was cut through and the operation was repeated five times on the same bar. Then a cast steel plate, one quarter inch thick was cut with the chisel, and the edge of which showed neither fissure nor any other alteration afterwards. An electrically hardened table knife cut iron wire one eighth of an inch in diameter as easy as a cotton string. The process is said to consist in the hardening of red-hot steel objects in a conductive bath traversed by an electric current. If these tests should be confirmed by further practical experiences, the results would be of the greatest importance to the manufacturers of tools.

The Camp Floyd Mining District.

Mercur Gold Fields, the Johannesburg of America, are in the Camp Floyd Mining District, Utah. Mercur town, the business center of a wide mining area, the boundaries of which are steadily enlarging, is situated thirty miles south-west from Salt Lake City, as the Crow flies, and by railroad is distant fifty-five miles. The main portion of the district is just across the Oquirrh mountain range, in Tooele County—destined to be the foremost gold yielding section of America.

gives it command of a vast area of fruitful country.

Camp Floyd is an historic land-mark. Near Fairfield the federal army—some 3,500 men—under the command of Colonel Albert Sidney Johnston, in 1858, established Camp Floyd, named for President Buchanan's secretary of war. Here the memorable "Utah War" was brought to a close. Fairfield, where Johnson made a prolonged halt, is to day the initial point of the Salt Lake & Mercur Railroad, a

excitements. Not only is this true, but more sorts of mining have been seriously attempted than in any other locality. The first claim recorded was a placer location, claiming "400 feet of gulch or cañon for mining purposes, with all facilities pertaining to placer diggings." From this record it is evident that gold was the metal the pioneer prospector counted on. Judging from subsequent events the gulch, or canyon, diggings failed to return fair profits and the placers must have been



VIEW OF MERCUR, UTAH

Salt Lake City is, and always will be, the outfitting and distributing point for the Camp Floyd mining district in Utah. As a preliminary inside of the value of the Mercur gold fields, a visit to Salt Lake City will be of much benefit, for it is in that city that the greater part of the capital has been found to develop the various properties. The head offices of all the shipping mines are located there. Its geographical and commercial situation—being the largest city between the western slope of the Rocky Mountains and the Pacific Coast—

commercial enterprise of great advantage to the thriving new camp on the other side of the Oquirrh range.

Naturally, when a few venturesome prospectors assembled here, in the spring of 1870, to organize a mining district, "The Camp Floyd Mining District" was suggested and adopted as the most appropriate name. The meeting to perfect the organization was held in the middle of April.

No metalliferous region of the Rocky Mountains has experienced so many sporadic

soon abandoned. This earliest attempt at gold mining is of interest simply as one of the phases showing the ups and downs of the district.

In this same year, 1870, a notable find of silver-bearing ore was made in the Sparrow Hawk and Last Chance lode claims, ground now owned by the Marion Company, on the northern outskirts of Mercur town. This uncovering of treasure proved of such great promise that the mine was sold to an English syndicate for a round sum.



STREET SCENE, MERCUR

A company was incorporated styled the 'Camp Floyd Silver Mining Company, the Sparrow Hawk mill was erected, in 1871, and first and last \$700,000 was expended, while not to exceed \$175,000 was taken from the mine. For a season the ore products were mostly of such high grade that they were more profitably shipped to the smelters than milled at home. Following closely after the Sparrow Hawk discovery, a renewed excitement was aroused by the Carrie Steele strike, which is still spoken of by old-timers as a memorable happening. From this ground a few men took out over \$80,000 in three months. There were other finds of less or more moment, and all told they were of sufficient consequence to cause a stampede to the camp, bringing prospectors and miners from far and near.

Of a sudden, early in 1872, Lewiston sprung up almost in a night, the town being built on the site now occupied by Mercur. On all sides there was life, vim and excitement. The silver bird perched on high, while stores, hotels, saloons and gambling houses thrived apace. Several four or six-horse stages arrived and departed daily, and for a brief season its votaries claimed Lewiston to be the liveliest mining town in the territory. In this heyday of excitement there were, perhaps, about as many buildings as Mercur could boast at the beginning of the present year, while the population numbered between 1,200 and 1,500. Before 1880 the mines were pronounced worthless. Gradually the town was deserted and the buildings, which were of the balloon pattern, disappeared one by one, until Lewiston Canyon had but one house and one inhabitant—Moses Manning, who put in his time working assessments for himself and other claim owners.

So closed the silver era of the Camp Floyd Mining District. Somewhere in the neighborhood of a million dollars was contributed to Utah's silver production from this region.

In the annals of the district the next phase forms the connecting link between doubtful successes and momentous achievements, as here begins the story of the Mercur mine. Arie



GEYSER MINE AND MILL

Pinedo, a German, located the Mercur lode claim in the spring of 1881, naming it the German word for mercury, in the belief that he had discovered a valuable vein carrying cinnabar, the common quick-silver ore. So well satisfied was he of this fact that he proceeded forthwith to obtain a patent for the ground.

The Receiver's receipt for the Mercur lode is dated March 22, 1882; mineral entry No. 735 for the Territory of Utah. Though cinnabar was brought to light in considerable amount the claim could not be made to pay, and little dreaming of the vast stores of gold in the mineralized zone he had opened, Pinedo, in disgust, abandoned the district, soon afterward leaving the country, to be hunted up in 1890 when a deed was wanted for the tract, 200 by 1,500 feet, the value of which was just beginning to be demonstrated.

Although the life had departed from Lewiston Canyon, a few prospectors each season rifted over the Oquirrh range, and others came in from Ophir to try their luck. It was probably in 1883 when gold was first found in the upper mineralized zone, or lode. Its presence was first made evident by assay. When the prospector was told that his ore carried gold he resorted to his pan for convincing proof. Numerous lots of rock were pulverized and washed, invariably failing to show colors of gold—one of several characteristic peculiarities of Mercur ore.

From about 1885 to 1889 this region appears



MARION MINE AND MILL

to have been wrapped in oblivion. In March, 1889, Joseph Smith, the largest owner of the shares of the present Marion Gold Mining Company, leaving the cars at Fairfield, walked over the range determined to test the Sparrow Hawk ground of the old Camp Floyd Silver Mining Company—now the property of the Marion Company. He sampled the ore faces in the abandoned workings and also the dump, for silver, having no thought of gold values, and decide they would pay to work. A small fifteen-ton amalgamating mill, equipped with rolls, pans and settlers, was put up. In a few months, after an expenditure of about \$9,000, it was apparent the procedure was a failure; and this was the last attempt at mining and milling these silver ores. There was shown to be considerable silver but the mineral was too base. Finding that extracting the silver could not be profitably accomplished, and remembering the story of cinnabar in the Mercur lode, he decided, in sheer desperation, as funds were getting low, to see if something could not be made out of quicksilver mining. At the same time understanding assaying, and recalling the myths about gold in the Mercur lode, he made a number of tests for the yellow metal, the first series of assays returning from

\$30 to \$90 a ton. Waning hopes were revived; all quicksilver notions

quickly vanished, and men were put to work mining for gold. The developments previously made by Pinedo, together with the general character of the formation, augured a large amount of ore, giving promise of good returns. It was late in the season when five tons were brought down over the snow, by raw-hides, to the bottom of the canyon and thence hauled by sleds to the amalgamating mill, where a short time before the treating of Sparrow Hawk silver ore had proved a failure. A careful sampling of the tailings from this trial run showed an apparent gold extraction of eighty per cent, which was deemed sufficiently encouraging to warrant going on with the undertaking. The milling of this five-ton lot from the Mercur claim closed the work of 1889, under bright and cheering auspices.

During the winter Mr. Smith endeavored to interest capital in what he was convinced would prove a good gold venture. In March, Gill S. Peyton and H. W. Brown were prevailed on to visit Lewiston Canyon. After carefully examining the auriferous ground, tested in the closing weeks of the previous year, they were amply stimulated by the showing to take hold of the enterprise. The patented Mercur lode claim, 200 by 1,500 feet, lies in the heart of a seventy-acre tract, the remainder of which had only recently been located, thus accomplishing a desirable consolidation of connected ground. Of necessity the first step to be taken was to obtain a deed from Arie Pinedo, the owner of the Mercur claim, and he was not in the United States. L. S. Manning, who was then operating with Joseph Smith, learned of the whereabouts of Pinedo and secured a bond for a deed for \$10,000. This accomplished, Messrs Peyton and Brown offered the seventy-acre group to the Nebraska coterie—farmers, stock growers, and withal shrewd, far-seeing business men—John Dern, E. H. Airis and John Heimrich. At the outstart \$10,000, to take up the Pinedo bond, was advanced by them, after which, in June, the Mercur Gold Mining and Milling Company was incorporated with capital stock of \$5,000,000, divided into 200,000 shares of a par value of \$25.00 each. According to the plan of the organization of the company there were 30,000 shares of the treasury stock which were taken by the Nebraskans at one dollar a share. Of this fund \$25,000 was expended in the erection of an amalgamating mill, with pans, settlers and the old regulation equipment, on the site of the present mill at Manning, a short distance above Fairfield; the remaining \$5,000 was spent in opening the mine and in building a road from the mine to the mill. Meanwhile another winter had set in and further operations were suspended until spring.

To within a comparatively recent date the story of the Mercur Company is the story of the serious mining for the king of metals in these unique gold fields. As the important achievements of this company afford the



MATTIE NO. 4 (MERCUR MINE) SACRAMENTO IN THE DISTANCE



NORTH AND SOUTH SECTION, ACROSS
LEWISTON CANYON

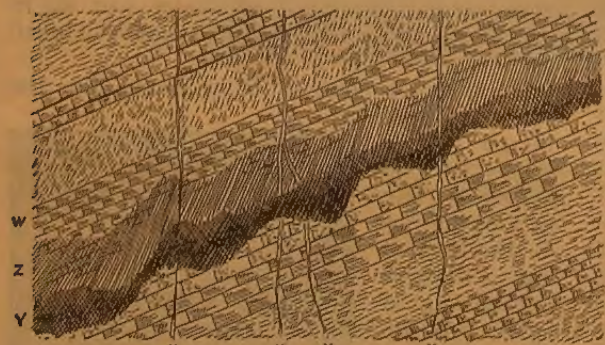
Z—Mercur Town. Y—Dikes.
X—Gold-bearing zone W—Silver-bearing zone

salient features in the history of the district, and as much of this information appears in type for the first time, they are told somewhat in detail. From 1890 until as late as the summer of 1893 the Mercur supplied the life of the revived and rejuvenated camp. Hence, naturally, in familiar phrase, when the region is now spoken of, Mercur has become the common name for the entire region, while Camp Floyd has taken second place in the mining world, though it is the recorded—and therefore official—title of the district. The latest appellation—the Johannesburg of America—its origin and aptness, will be explained after speaking of the ore, the vein formation and the winning of the gold from the enveloping matrix.

On the opening of the season, in the spring of 1891, the Mercur mill was given its initial trial with roseate anticipations of excellent results. Some 1,500 tons of ore, that by careful sampling showed an average value of \$18.00 a ton, were put through. Assays from numerous samples of the tailings indicated that an extraction of about eighty per cent, or \$14.40 per ton, had been accomplished, which would have been a highly satisfactory record. From these figures it is shown that the 1,500 tons ought to have afforded a clean up of \$21,600 while in reality it proved to be less than \$5,000.

About this time news of the success of the McArthur-Forrest cyanide process for treating gold ores was heralded abroad, and mining papers, particularly those of Colorado, had much to say on this topic. Mr. Smith had used cyanide of potassium for cleaning quicksilver, and it occurred to him that quite probably the gold had been dissolved—the method of extracting the gold from the ore by cyaniding—and in this way the wide discrepancy between the expectation and the realization of the mill clean-up would be accounted for. A number of tests and experiments were made which demonstrated this to be the case. Soon afterwards a sack of ore was sent to Denver for a preliminary trial, and the per centage of saving on this small lot was so favorable that the company shipped a carload for a more complete, practical working test. On this shipment an extraction of eighty per cent was paid for, and all in all, it was so entirely satisfactory that the cyaniding treatment was determined upon by the company.

Necessary changes were made in the mill in 1892, and the new treatment was attempted.



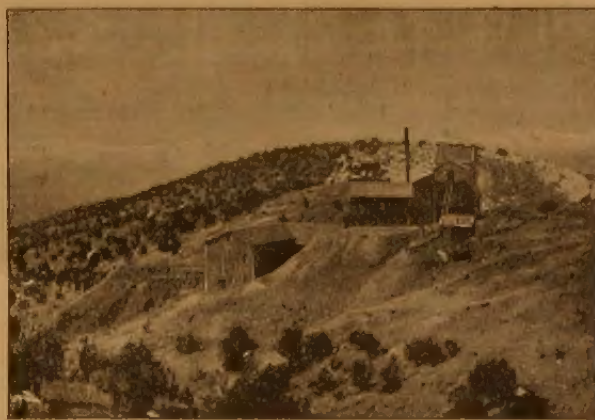
SECTION OF A PORTION OF MERCUR ORE BODY

Y—Ore, with chert nodules. Z—Shaly and soapy material.
W—Crystalline limestone floor. W—Drab limestone roof.
X—Heavy spar veins.

Several modifications were adopted, the two most important being in not crushing the ore so finely and in not agitating it while in the solution. By these and other minor changes, cyaniding has proven to be the desired panacea for winning the Mercur gold.

The complete demonstration of this all-important truth was the accomplishment of the operations of 1892; a season of doubt, trial and tribulation, involving heavy expenditures and no immediate returns, the particulars of which need not be itemized. After the overwhelming failure of the amalgamating proposition the personnel of the Mercur Company underwent several changes, Messrs. Dern, Airis and Heimrich still continuing, while the original promoters dropped out.

As advances in the exploration of the Mercur vein, as well as in the economic winning of the gold from the ore were steadily being made, the skeptics smiled credulously at the idea of obtaining a profit from the abandoned mines of Lewiston Canyon. It is, in truth today, but little more than a year since the worth of the veins began to be appreciated. Meanwhile the Company continued to quietly work away, exposing more ore, until, during the spring of 1893, from thirty to sixty tons were being hauled daily, eight miles across Oquirrh range to the mill at Manning, where



SUNSHINE MINE AND MILL

at last, gold in good paying quantities was being saved. From that time skepticism was no longer triumphant. Soon a tide of emigration set in, and Lewiston Canyon of a sudden awoke from its twenty years' sleep to find the remarkable metamorphosis of an uncertain silver camp transformed to extensive gold fields of great value. Such was the status of affairs as the old year passed away, with every assurance of a substantial growth during 1894.

It was still in 1893 that the second cyaniding mill was constructed, having begun operations in June. This is the plant of the Marion Gold Mining Company, though the company was not incorporated until September of the following year. Joseph Smith, who first proved the gold values in the Mercur vein, was the chief organizer and promoter of the Marion property, starting systematic development for gold here in 1892, after severing his connection with the Mercur Company.

From this point events follow each other in rapid succession. The season of 1894 was one of active prospecting. Yet, even then, among many, the deep-seated skepticism, an outgrowth of the old exploded silver boom in this identical territory, continued to exert a sinister influence, which did not entirely disappear before the summer of 1895. In January, 1894, the Mercur mine, at that time increased

to 140 acres, was bonded to Henry R. Wolcott, of Colorado, and associates, for \$750,000, for three months. The vein was prospected by drifts and cross-



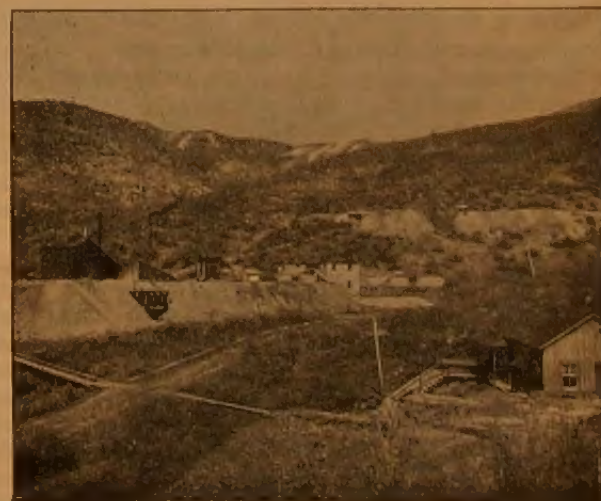
EAST GOLDEN GATE
AND WONDER SHAFT HOUSES

cuts, and several diamond-drill holes were bored, the testing of the ground being conducted by R. C. Hills, a prominent Colorado mining engineer. At the expiration of the three months an extension of the bond was asked for, as Mr. Hills, while well satisfied with the worth of the property, was not sufficiently so to indorse the purchase, more particularly as his exploitation had not given the results he had counted on. The Mercur folk refused to extend the bond and resumed the active working of the mine. It was afterwards found that two of the bores from the diamond drill passed through the vein in barren lime boulders, while a short distance on either side was a strong body of good grade ore. Had fortune favored Mr. Hills a few feet, one side or the other, in selecting the points where his diamond drill penetrated the vein it is probable the Nebraskans would not to day be receiving handsome monthly dividends from this bonanza.

Another short-time bond for \$1,500,000 was secured on the Mercur by Captain J. R. DeLamar towards the close of 1895, but the transfer of title was not consummated owing, as it is said, to the unfavorable condition of the money market during the mid-winter holiday period and immediately thereafter.

To day it is safe to say this fine property is not for sale—at least not for double the amount of the DeLamar option.

What remains of the story of the Mercur mine is replete with interest. The company now owns 160 acres in a connected body covering the vein, which has been opened for four-fifths of a mile on the strike or course, while the longest incline is over 1,200 feet. The dip of the ore zone is that of the enveloping strata—about fifteen or twenty degrees from the horizon toward Lewiston Canyon. In thickness the ore varies from ten to fifty feet and probably averages nearly twenty feet. So far as exploration has gone the values well hold their own throughout the entire property. The mine is operated by a system of tunnels run into the side hill on the strike. The workings are a confusing net-work of openings that show a vast amount of ore reserves with extensive rich territory of virgin ground



GOLDEN GATE SHAFT HOUSES

only partly explored. During 1895 some 50,000 tons were sent to the mill which averaged \$12 a ton, the metallic extraction being a fraction above 83 per cent. of the assays. The cost of mining, transportation and treatment, with interest on investment, including office expenses, was \$3.40 a ton.

Up to the middle of March, 1896, a round million dollars was the yield from this ground, of which \$425,000 were distributed in dividends. This is an exceptional record for premiums received by the stockholders of a comparatively new company. Fully \$150,000

ling the mine products, \$100 will be added to the daily profit, on an output of 200 tons. It is probable that the cyaniding plant at Manning will in the near future be a custom mill, for which there is already a generous demand.

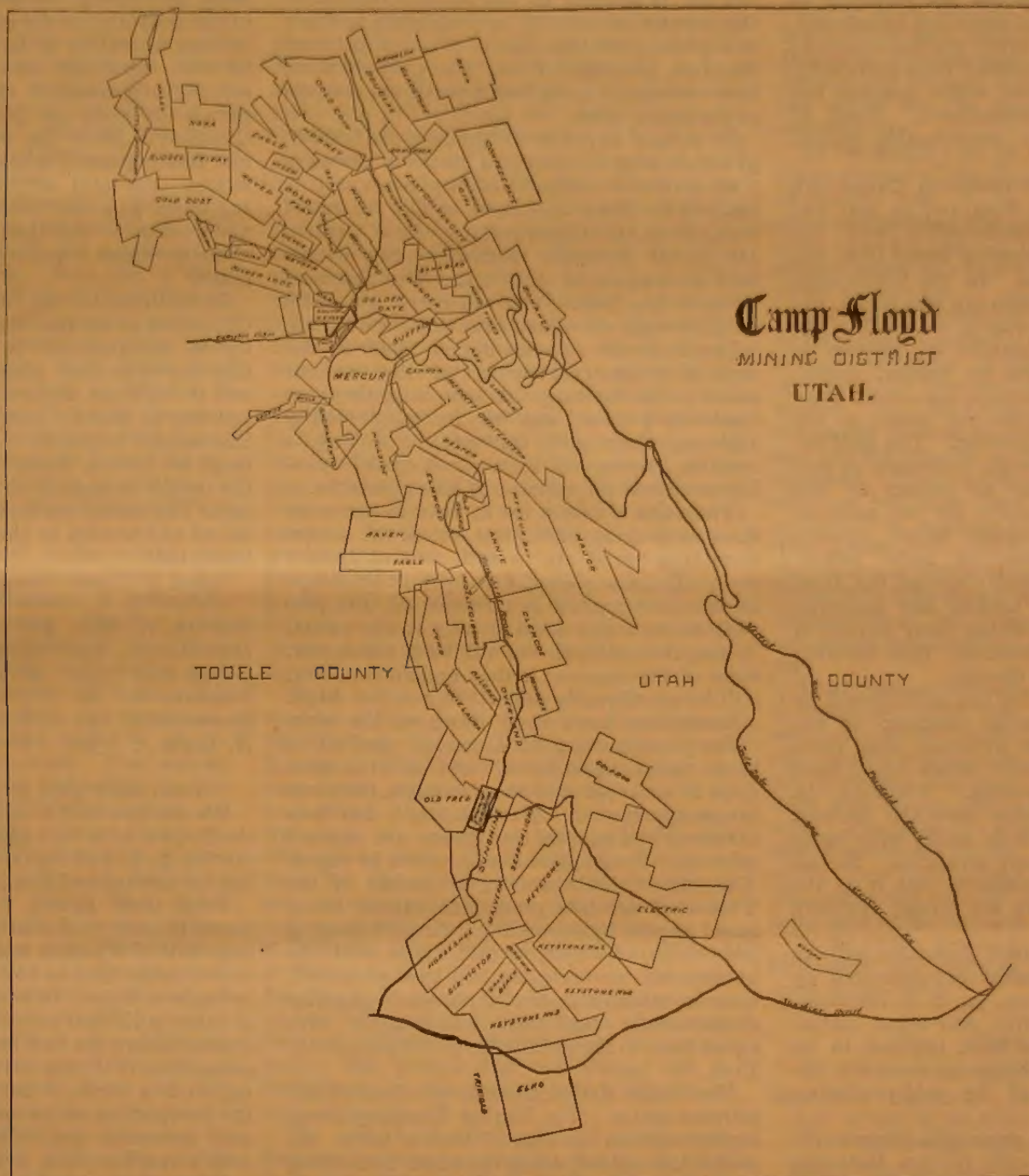
These are the achievements of the Mercur Company up to date; covering the development period, both as regards to proving the resources of the gold bearing ground and in the perfection of the method of extracting the values from the ore.

With the new mill in successful operation the monthly premium to stockholders, now

of potassic cyanide added. It requires from three to six days to fully dissolve the gold from a vat or tank, charged with ore.

Ordinarily rock for cyaniding is made to pass through sieves divided into from twelve to thirty meshes to the inch, while here the screens in use allow pieces a half-inch or more thick to pass to the leaching vats. This is one of the astonishing surprises to all acquainted with gold metallurgy on their first visit.

The metallic gold extraction varies from 50 to 95 per cent., according to the handling and the percentage of arsenic in the ore. Each



was expended in enlarging the mill, which last year was given a daily capacity of 200 tons, acquiring additional territory and in perfecting equipment.

A steam hoist has been erected on the Matie No. 4, on the extreme southeast end of the property, and the ground adjoining the Golden Gate on the northeast will be opened this season. These new workings are planned to insure an ample ore supply for the 400-ton mill now being constructed at the mine. By thus treating the ore immediately at home, and with a more systematic method of hand-

\$25,000, can easily be doubled and the \$50,000 rate steadily maintained.

Cyaniding, which has proven such an important factor in the industrial development of the district, is essentially a process of gold extraction by lixiviation. The metallic gold being first brought into solution is afterwards precipitated by passing the liquor over zinc shavings, about one-half pound of zinc being dissolved for each ounce of gold thrown down. The strength of the solvent is one-half per cent potassic cyanide; or about forty eight gallons of water, with from one to two pounds

month there is an advance made in the practical working of the process, as all the details are becoming better understood. It is quite probable that during the current year the actual extraction in the better-constructed mills will average above eighty five per cent.

A comparison has been made, along industrial lines, between Mercur and Leadville. Curiously enough the analogy is found to be found further carried out in the geology of the two regions, as in each the profit-paying ore occurs in Carboniferous limestone, in more or less close association with eruptive rocks; al-

though the eruptives at Leadville and the details of their mode of occurrence are quite different. However, the fundamental fact that the ore here is in Carboniferous limestone, associated with eruptive rocks, a combination found in so many of the great western mining districts, is in itself suggestive of Mercur's continued prosperity.

The town of Mercur is near the vertical axis of an uplift caused probably by the intrusion of an eruptive mass immediately beneath the strata, and from this axis the strata are inclined in all directions. As is frequent in such uplifts, the summit of the arch has been deeply eroded, forming Lewiston Canon, where the upturned strata are exposed to view. The predominant rocks are limestones, especially toward the lower portion exposed; above alternating with shaly beds containing thin layers of limestone, while towards the summit shaly beds predominate. Some of the limestones contain considerable quartz material.

Outcropping around Lewiston Canon are two ore-bearing zones, from 100 to 200 feet apart, substantially conformable with the strata, and therefore dipping away from the center of the upheaval. In the lower zone the silver of the Lewiston era was found, the ore occurring in the quartz material. The upper metalliferous horizon is the one to which the district owes its present importance. Here the auriferous ore occurs as an impregnation of limestone and shale, in the main, along lines of bedding. The gold deposition took place through transverse or vertical fissures, reaching to greater or less depths, affording channels for the mineralizing solutions and vapors forced upward from the areas of eruptive rocks below. These solutions and vapors spread out from the fissures along the broken and fractured lines of bedding, depositing their burden of gold and associated minerals, thus forming the ore deposits of the district.

There is no reason why the gold should be confined to one horizon or stratum; on the contrary, there is clear evidence that there are two and possibly more strata which have proved to be gold bearing. Probably the Sunshine zone is different from the Mercur, as the paying mineral is in shale, with bands of limestone of different structure. At all events, there is no evidence that it is the same stratum, and there are strong contrary indications.

This outline of the rock formation and ore deposition is in substance that approved by Messrs. R. A. F. Penrose, jr., S. F. Emmons, J. E. Spurr, R. C. Hills and other distinguished scientists who have testified, in no uncertain terms, as to the great economic importance and extent of the gold-producing area.

Probably the gold is present in microscopic metallic particles, as only in rare instances has its presence been made manifest by panning.

The ores of the region are of two varieties, oxidized and arsenical or base. Each is unique. The gangue, or waste, of the veins is made up of the mixture of the rock of the enveloping strata, imperfect quartzite limestone and shale, frequently stained by clayey or talcose material. For the most part, the ore has a yellowish cast, though each separate kind of rock retains its distinctive characteristics. There is but little iron, and the mineral as mined goes from thirty to sixty per cent in excess of silica, a most desirable feature for cyaniding. Cinnabar, with its singular red color, occurs in small bunches,

thin layers and fine stringers. It lends interest to the mining operations, though nowhere is it present in sufficient quantity to pay for the quicksilver contents. Native sulphur is found in different parts of the region, the most peculiar and largest specimens as yet brought to light coming from Sunshine ground, in the southern end of the district.

All the producing properties are mining oxidized ores, as they supply the only products that at present can be economically treated. The cyanide solution is impaired by the presence of arsenic, failing to dissolve the gold. On this account arsenical rock is left standing in the mine, or is thrown out before the ore is shipped to the mill. Ordinarily, this separation is easily accomplished as there is a plainly marked line of division between the two varieties of ore, the proportion of base commonly being but a small per centage of the entire mass.

In general appearance, the base ore is dark, greenish, almost black, on breaking showing thin seams of realgar and orpiment, arsenic sulphides. Here and there it fills the entire vein, as in the Golden Gate, where Captain De Lamar proposes to convert the arsenic into a commercial product. The arsenical mineral has been found to carry but little gold, though often the associated rock is rich, while it is the sole stumbling block in the way of a clean extraction of the precious metal. On roasting the base ores they are rendered porous, and by leaching readily yield up their gold contents. Ere long, a roasting annex will form a part of the cyanide treatment for mineral of this character.

The veins are from ten to forty feet or more thick, averaging fifteen feet, or, as the miners term it, a ton of ore to each foot of surface area. In some places, the apparent thickness of the paying rock is phenomenal, due possibly to favorable local folding of the strata. When the mineral has all been taken out, some of the caverns, if they remain standing, will be considerably more than 100 feet high.

Exceptions have been taken to the term "The Johannesburg of America," applied to these unique gold fields, and several have gone to some pains to show wherein the name is non-appropriate. Nevertheless it has been taken up and adopted and there are reasons why the title should and will remain in vogue. The original Johannesburg ore bodies of the Transvaal are low grade the values being saved in part by cyaniding; the gold-bearing beds are of unusual thickness and the boundaries, as exploration has advanced, have constantly extended outward—peculiar characteristic conditions which apply with equal force to the goldfields of Tooele county Utah.

Next to the Mercur, the Marion mine and mill attracts notice. The Marion Company owns eighty acres on the edge of Mercur town, the mill below and adjoining the mine. Something of the history of this property has already been told in this article. Underground there are in the neighborhood of three miles of development workings. Since the mill first started in June 1893, the first in the district after the Mercur, it has been idle but three days, due to a slight break-down last January. At the outstart the capacity was from 50 to 60 tons a day and it has never been enlarged. The ore yields about \$4.50 per ton, the extraction being 90 per cent, while the cost of mining and treatment is under three dollars a ton. This mill is fortunate in having a water supply of its own, the only one in camp from a spring two miles to the north. In 1895 nearly 20,000 tons were mined. Substantial

dividends are regularly paid, but being a close corporation the shares being held mainly by three persons, figures are not made known. The mine has extensive ore reserves opened.

Nearly four miles to the south of Mercur is the Sunshine mine a new town of the same name, which has budded forth since January last. In the Sunshine the main working incline is over 600 feet on the dip of the vein, which is thirty-three degrees. Numerous levels have been driven on the vein, all exposed faces are in ore and the visitor is impressed with the magnitude of the rich appearing reserves blocked out. This development is of special moment from the location of the property, so far removed from the gold bearing formation of Lewiston Canyon. By all odds the finest, best equipped, and most scientifically managed mill in the entire region is the sixty-ton plant of the Sunshine Company. Here the economy of handling and treating ore is brought very near to perfection—the total cost, including mining, being under \$2 a ton. Almost invariably silver and gold occur together in nature. In Sunshine ore there is not a trace of silver to be found.

In addition to the mills spoken of, the Geyser, next to the Marion and the Sacramento, northwest of the Mercur, each has a fifty-ton cyaniding plant. The Sacramento mill is the latest addition, having begun ore-treating in March, 1896. Both Geyser and Sacramento mines have choice ground with large ore bodies, though space will not allow the details in regard to them to be entered into. The actual ore tonnage now being daily mined and treated in the camp can thus be tabulated:

MINES.	TONS	VALUE PER TON.	LOSS PER TON.	GOLD EXTRACTION
Mercur.....	200	\$12 80	\$1 20	\$2,320 00
Marion....	55	4 50	40	225 50
Geyser.....	50	10 00	40	450 00
Sunshine ..	60	7 00	2 25	385 00
Sacramento	50	8 00	90	255 00
N. Light ..	50	6 00

Total daily gold product.\$3,635 50

We are informed from good authority that the Geyser mine in August worked ore containing \$2.80 and realized a profit after paying for mining and treating.

From these figures it is shown that the monthly gold yield is at present \$109,065.00, over half of which is from the Mercur, an inconsiderable total in view of the ore bodies brought to light. In addition there are several other mills that are scheduled to be in operation before the end of the year. In this connection it should be remembered that the region as a whole is but just emerging from the prospecting stage, and that every mine, with reasonable ore bodies opened, equipped with a cyanide plant, is a dividend payer.

It would be impossible to here speak of all the properties of proven value, to say nothing of the many of great prospective worth. Our limits have already been over-reached and the half has hardly been told that might be relative to the resources of the district. Only the active producers have been mentioned thus far.

Located at the north-east of the Mercur and south-east of the valuable Brickyard group is the choice territory of the Golden Gate, owned by Captain J. R. De Lamar. It is a tract of 140 acres, the richness of which has been systematically tested for the past dozen months. The property was purchased by Captain De Lamar in the spring of 1895.

Some 1200 feet of development work show immense ore reserves that will require years to exhaust. There are several shafts connected by inclines, with numerous levels and crosscuts, exposing paying mineral as thick as in the Mercur, it not more so, and of a much higher grade. The first ore bodies opened up were base for the most part, though in the past few months extensive deposits of oxidized ore have been brought to light.

Here is by no manner of means simply a low grade proposition. Some test carload shipments recently made gave highly flattering returns. Save the large tonnage on the dumps, as a result of exploration, no ore has been mined. When Captain De Lamar visited the camp in March, 1896, he stated that the problem of the economical saving of gold from the base mineral was practically solved and that before many months the arsenic rock would be contributing handsomely to Utah's gold production. Beyond peradventure, the Golden Gate will prove the best of all the region as yet known.

So far the history of America's Johannesburg has been a story of low grade ore, the supply shown from month to month to be more and more extensive. It is not a mere form of words to say that there are vast stores of such mineral that it will require years to work out. The future annals may in addition tell of bodies of rich, high grade gold ore in this region, as the one spoken of in the Golden Gate is not the only instance brought to light. The systematic prospecting recently inaugurated has made known the existence of valuable smelting products, in nearby localities, where heretofore gold was not looked for.

Both on the surface and underground this is a dry camp, Lewiston Canyon being a dry water course, if the misnomer is allowable, the greater part of the year. For the needs of mining this is a desideratum, enabling the carrying on of mining exploration and ore extraction at a minimum of cost. For other purposes on the surface, ore treatment, domestic needs and the like, water is an essential that had to be provided. This was accomplished in the past fall and winter by the efforts of Col. M. A. Wall, the organizer and promoter of the Gold Belt Water Company, who is responsible for the admirable system that supplies the mines, mills and houses of the town. The water is taken from Ophir Canyon, where is located a water driven pump connecting with a pipe line passing over a ridge 1,400 feet high, thence down to Mercur, a distance of five miles. Mines and mills are taxed from fifteen to fifty cents a ton, according to the grade of ore, while to water a home costs \$3.50 a month and special rates are made for other uses. Now that the water of Ophir Canyon has been harnessed for useful needs, the company is planning to further utilize the surplus power, of which about 300 horse power can be made available for operating mills, mine-boists, air-drills as well as to illumine the town and mines by electric lights.

Possibly nothing has served to make Mercur more widely known, beyond the boundaries of Utah, than the building of the Salt Lake & Mercur Railroad across the Oquirrh Mountains. This was practically an achievement of a year ending July, 1895, a period of general business depression, and its construction afforded unmistakable evidence of the worth and permanence of the mines. It is a monument to the farseeing sagacity of J. G. Jacobs, the Vice-President and General Manager. At

Mercur, the general elevation is 7,000 feet, from which point the track winds and twists, often doubling on itself, as it climbs steep grades and rounds sharp curves, ascending 2,000 feet to the summit, a distance of eight miles. Mercur town is three miles from the summit, or eleven miles from Fairfield, elevation 6,400 feet, and the track is no less steep, or straighter than on the other slope of the range. It is a standard gauge roadbed, the grades in places exceeding six per cent., or over 320 feet to the mile. The locomotives are of the Shea pattern and readily handle four cars of ore. Mine owners and business men can leave Salt Lake City in the morning, have over five hours at Mercur and return the same day.

Within three years over twenty cyaniding plants will be running, and each new mill means the employment of from fifty to 300 men at profit-paying mining, besides the many engaged in allied and other vocations. Should the recent discoveries of high grade ore prove of lasting moment the growth will be still more rapid. Be that as it may, the district is certain to support several towns and will boast a large population, probably more than 25,000 people. Mercur, the present chief business center, in all probability will, from its desirable location near the largest producing mine, and other advantages, continue to be the metropolis. To-day it affords many attractive business opportunities and is unquestionably the most thriving and prosperous town of 2,000 population anywhere in America. Substantial buildings are going up on all sides, and visitors cannot fail to be impressed with the prevailing air of conservatism and permanency, not found in ephemeral camps. Besides its complete system of water-works, the town has a telegraph and telephone service, connecting with the principal points of Utah, a bank, two newspapers, model schools and churches—in brief, it is a coming mining metropolis of no insignificant importance.

From a carefully prepared paper, recently read by Colonel J. W. Donellan, President of the Salt Lake Mining Exchange, this extract is taken: "With such wondrous mines at our very doors, it behooves our citizens to be up and doing. Let every one who can spare a little from his business or savings, set some idle man at work prospecting. It is a good time for the 'grub stake;' fill the Mercur country with prospectors. But in grub staking, prospecting and all mining ventures, we should use every precaution and care that a prudent business man would use in his ordinary business affairs. It is only in the exercise of thoughtful care, intelligent discrimination and prudence in the selection of men and means, that prospecting and mining can be brought up to the standard of a legitimate business."

We wish to thank the Rio Grand Western Railway for many courtesies, and for furnishing us with valuable data for this article. The Rio Grande Western Railway has always been the miners' friend, and it is owing to their enterprise that many of Utah's camps are well known to-day. They have the principal road running into Salt Lake City, which is the starting point to reach all the mining camps. With their eastern allies, the Denver & Rio Grande and Colorado & Midland and their western connections, the Southern Pacific and Oregon Short Line Companies, they have facilities to handle business that are not equalled in the West.

Charles R. Wores, the mining man of Tucson, is in Tombstone, Arizona, on business.

GENERAL NEWS.

The McArthur-Forrest Cyanide Patents Void.

News reached this country some time ago from South Africa that the high courts of that republic had declared void the McArthur-Forrest patents for the cyanide process for the recovery of gold. The decision was given in a suit brought by the combined mine owners of Johannesburg and the Transvaal.

This decision will have an important bearing upon every interest connected with gold mining, for it is a matter which involved many millions of dollars directly, and untold millions altogether.

Up to 1890 the reduction works had been running upon the old plan, and of course much value was carried off in the tailings. It was at this time that two Scotchmen, McArthur and Forrest, took out patents all over the world for the cyanide process of gold recovery.

In the single year of 1894 in the Witwatersrand district of the Transvaal 2,847,378 tons of tailings and 18,351 tons of concentrates were put through the process. This yielded more than \$10,000,000 in gold with an apparent profit over the cost of the process of about \$7,350,000.

This seems to indicate that the miners ought to have been satisfied. But there was one serious drawback to their happiness. The African Gold Recovery Company, which controlled the McArthur-Forrest patents in the South African republic, did not let anyone use the process without the payment of royalties. These payments varied with individuals, but they were so large that they amounted to millions of dollars every year. The miners made efforts to get reductions of the royalties, but no agreement was reached. Then they determined to fight, and made an application to the attorney general to have the patent set aside because of a lack of novelty.

The attorney general appointed James May to bring action at the miners' expense. It was asserted that although the patentees of the cyanide process may have been the original inventors, the same thing had actually been done before, although not upon a large scale. Commissions were issued for the taking of testimony in the United States, Australia, New Zealand and England in the case. The testimony showed that the process had been used before as early as 1885.

As far as the South African gold fields are concerned the decision throws the process open to the public.

(Copy.)

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Very respectfully,

ARCHIE THOMPSON.

P. D. Barnhart, one of Prescott's assayers has just returned home from a visit to his mines on the Colorado river.

PERSONAL-NEWS ITEMS

W. B. Thorne, of Kansas City, Mo., who has some mining properties near Phoenix, Arizona, was in that city November 18th in the interest of his claims.

S. M. Kelsey, one of the owners of the Lost Horse mine, located about 68 miles east of Banning, has recently returned to Los Angeles from a visit to his home in Kansas City, Mo.

Wm. E. Gray, a well known mining man from Colorado, is paying a periodical visit to Phoenix, Ariz. Mr. Gray's mission this time is to do some assessment work on the Castle Creek property, fifty-seven miles from Phoenix.

J. B. Saint, a well known mining man from Albuquerque, N. M., arrived in Phoenix, Ariz., November 18th, to attend the Irrigation Congress to be held in that city December 15th, 16th and 17th.

J. B. Dennis, of the Indian Queen mine near Perris, Riverside county, Calif., was a caller at the Journal office Nov. the 24th.

C. M. Thorndyke, the mining man who is working near Snowflake, Ariz., was back in Phoenix for a few days last week.

Henry Bratnober, C. A. Molton, James B. Farish, of Denver Colo., and Ellsworth Daggett, of Salt Lake, Utah, are all at Telluride, Colorado, making another examination of the Tom Boy mine for the Exploration Company, of London.

Samuel Donnelly of the Copper Glimmer mine near Huachuca, Ariz., was in Tombstone November 18th.

Jos. F. Spellman, agent of the Chrome Steel Works of Brooklyn, N. Y., whose celebrated steel shoes and dies are known all over the world, was a caller at the JOURNAL office the 16th ult.

Superintendent Thos. L. Bailey, of the Mohawk mines of Mammoth, Arizona, was in Tucson the 20th ult.

Leopold Meyer, a mining engineer of Belgium, arrived in San Francisco last week in the interest of Belgian and French capitalists seeking large mining investments in California.

Harry Temple returned to Globe, Ariz., Monday, November 16th, from the Buell & Gerald mines below Riverside, south of Globe.

Can you run a (Cornish) or steam jig? Do you thoroughly understand one? If so, read the ad on page 18, near the top left-hand side. To such a man will be paid a good salary. Don't all speak at once! Address "G," JOURNAL office, Stinson Block, Los Angeles, Cal.

A. I. Brown, who represents the California Power Works, was in Globe, Ariz., the 16th ult. and placed several orders.

A. Burch, the Salt Lake mining engineer, has assumed charge of the Lawler gold mines in Southern Oregon.

D. D. Lucid of Harqua Hala, Arizona, a well known mining man is in Phoenix on a short visit.

H. B. Eldridge, general agent for the Bradley Pulverizer Company, manufacturers of the Griffin mills, is in Salt Lake with his wife and son. Mr. Eldridge has just returned from London and Paris, and while in the two capitols he sold a great many Griffin mills for the mines of South Africa and Westralia.

Charles Goddard of Yavapai county was in Phoenix, Arizona, from the north Wednesday afternoon, November 18th. He reports considerable activity in mining circles throughout Yavapai county and expects many good properties to be opened up shortly.

Alfred M. Tripple, of Florence, N. M., son of Dr. Alex Tripple, the mining man, was in Phoenix, Ariz. last week for a few days' rest.

D. Cole arrived in Phoenix, Arizona from Chicago, Ill., November 17th. He is there to look at some mining property.

Louis Ruhl, general traveling agent of the Roessler & Hasselacher Chemical Company, the cyanide manufacturers, and John Andrae, one of the company's officers at the manufactory in Germany, are both in Salt Lake. Mr. Andrae is acquiring information as to the local modifications in the application of cyanide of potassium to the extraction of gold and silver and the result of his investigation will be laid before the management in Germany on his return.

J. H. Talbot, one of the mine inspectors of Colorado, was in Phoenix, Arizona. He was there to examine some mining property.

John F. Johnson, the cyanide man, has returned to Phoenix, Ariz., from Wickenburg to continue his tour of the camps that use this process.

H. J. Delamer, of the Temple Bar mines, was in Kingman, Ariz., last week.

Joe Morinas was in Kingman, Ariz., from the Chimehuevas mountains last week. He and Jas. Raul are getting some fine ore on the Schoolmarm mine.

George Tresher, the genial superintendent of the Cedar Valley Mining Company, was in Kingman, Ariz., looking after the sampling of about twenty tons of concentrates, last week.

OBITUARY.

Frank P. Arbuckle, Chairman of the State Democratic Central Committee of Colorado, and a millionaire mine owner of Denver, was found dead on Eighth avenue, New York city, at an early hour Thursday, Nov. 19th. Although he has been a sufferer from heart disease of late, the police think he is the victim of foot pads, as the body was stripped of jewelry and money which was known to have been in the possession of the dead man. Mr. Arbuckle owned rich mining property all over the west, some of the larger properties being at White Hills, Arizona.

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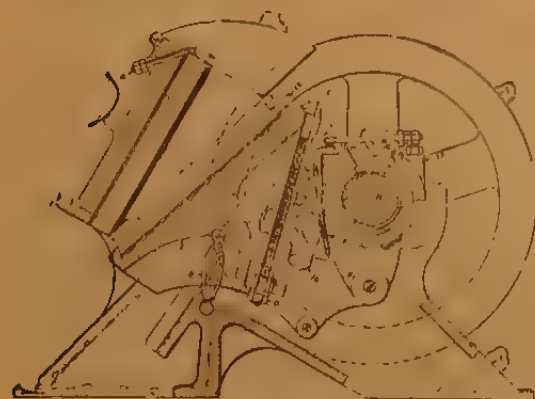
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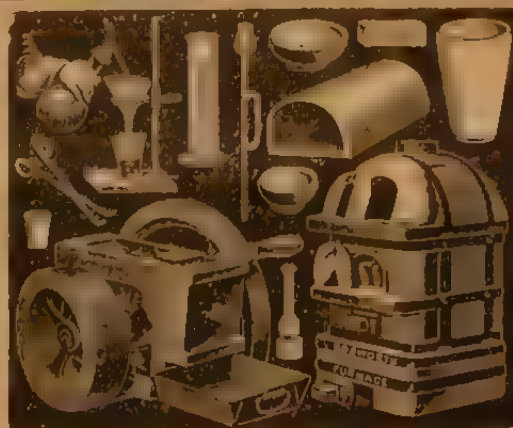


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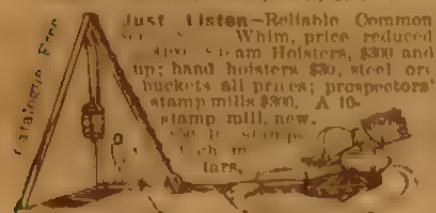
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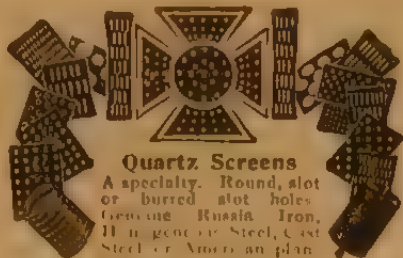
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METAL MARKET.

New York Quotations:

	SILVER.	COPPER.	LEAD.
Nov. 16	65	11 00	2 75
" 17	64	11 10	2 75
" 18	64	11 25	2 75
" 19	65	11 50	2 75
" 20	65	11 50	2 75
" 21	65	11 50	2 75
" 22	65	11 50	2 75
" 23	65	11 50	2 75
" 24	65	11 50	2 75
" 25	65	11 45	2 70
" 26	65	11 40	2 60
" 27	65	11 35	2 60
" 28	65	11 35	2 60
" 30	65	11 30	2 60

MINING STOCK QUOTATIONS.

BOSTON

Allouez	80	Franklin	10 00
Atlantic	18 00	Kearsarge	10 00
Boston & Mont's	75 00	Quincy	23 00
Butte & Boston	1 50	Quincy	108 00
Cal & Helica	300 00	Tamarack	75 00
Centennial	2 00	Wolverine	8 50

COLORADO SPRINGS STOCKS

Aetna	81	Inley	000
Alamo	08 1/2	Isabella	09
Anaconda	1 19	Isabella Stamp	42
Argentine Juariata	45	Jack Pot	06
Bangkok-Corn Belle	02 1/2	Jefferson	11 1/2
Bankers	18 1/2	Keystone	08
Ben Hur	01	Marion	21
Bob Lee	02	Maros	15 1/2
C & N	01 1/2	Mollie Gibson	50
C & C & Manion	04	Monarch	05 1/2
Creede & C C	08 1/2	Mount Rosa	14
Croesus	01 1/2	Orion	08 1/2
C U Consolidated	18 1/2	Orphan Reel	11 1/2
Des Moines	03 1/2	Pharmacist	18 1/2
Fannie Rawlins	07 1/2	Portland	25
Favorite	10	People's	08 1/2
Franklin	01 1/2	Sacramento	08 1/2
Garfield Group	08 1/2	Specimen	08 1/2
Golden Eagle	03 1/2	Star of the West	000
Golden Fleece	90	Trachyte	03 1/2
Gold & Globe	18 1/2	Union Gold	29
Gold Standard	05 1/2	Virginia M	03
Humboldt	03	Work	08 1/2
Ingham C	16		

DENVER STOCK REPORT.

Aetna	81	Elkton	1 50
Alamo	08 1/2	Eureka	009
Anaconda	1 24	Garfield Group	08 1/2
Arcadia	004	Golden Fleece	10
" Consolidated	18	Goldsmith	008 1/2
Argentine Jun- ata	48 1/2	Gold Standard	05 1/2
Bangkok-C-Bell	02 1/2	Inley	08 1/2
Bankers	14 1/2	Iron Clad	08 1/2
Ben Hur	01	Isabella	42 1/2
Bob Lee	02	Jack Pot	06
Boston & C C	01 1/2	Jefferson	11 1/2
Chimbarazo	01 1/2	Mollie Gibson	50
C. K & N	13	New Zealand	08 1/2
Colo. C & M	04 1/2	People's	08 1/2
C C. Con	16 1/2	Pharmacist	18 1/2

HELENA, MONTANA

Alice	25	Granite Mount	1 50
Bald Butte	2 55	Hope	1 50
Benton Group	10	Iron Mountain	42
Bi-Metallic	3 00	Ontario	1 00
Elizabeth	10	Poorman	40

NEW YORK.

Crown Point	45	Sierra Nevada	85
Con. Cal & Va.	1 80	Standard	2 75
Gould & Curry	80	Union Con.	53
Hale & Norcross	1 25	Iron Silver	70
Homestake	80 50	Quicksilver	3 00
Mexican	50	Quicksilver pld	17 02
Ontario	14 50	Bulwer	25
Ophir	1 30	Yellow Jacket	35
Plymouth	20	Deadwood	45

SAN FRANCISCO.

Alta	10	Mono	15
Belcher	37	Nevada Queen	50
Best & Belcher	98	Ophir	95
Bodie Con	55	Potosi	85
Chollar	2 25	Savage	75
Con. Cal & Va.	1 80	Sierra Nevada	53
Crown Point	45	Union Con	45
Hale & Norcross	1 25	Utah	11
Mexican	55	Yellow Jacket	45
Gould & Curry	85	Bulwer	25

ST. LOUIS.

American Nettle	25	Elizabeth	20
Granite Mt.	1 50	Leo	3
Adams	80	Hope	1 40
Bi-metallic	3 30	Small Hopes	80

SALT LAKE CITY

Ajax	80	Horn Silver	2 05
Alliance	25	Little Pittsburg	01 1/2
Am. Nat G's	00 1/2	Lucky Bill	22 1/2
Anchor	1 25	Mammoth	2 00
Bogan	15	Mercur	8 15
Bull. Beck	8 00	Ontario	10 00
Cent Eureka	75 00	Rover	27 1/2
Dalton	02 1/2	Silver King	17 25
Daly	7 50	Sioux Con	95
Daily West	8 50	Swansea	2 40
Four Aces	20	So Swansea	1 00
Galeana	1 80	Tetro	08
Geyser	1 00	Utah	1 45

MEXICO

Name of Company	State	Price
Asturias y Anexas	Zacatecas	400
Cerro Colorado	Chihuahua	10
Concepcion y Anexas	S. Luis Potosi	180
do. pre.		100
do. pre.		100
Luz de Burda	Michoacan	30
do. Free stock		30
Luz de Muravillas	Hidalgo	110
Real del Monte		850
Rosario y Anexas	Durango	70
do. pre.		50
San Rafael del Oro	Guanajuato	50
Sta. Gertr y Anexas	Hidalgo	187
do. Free Stock		301
Sto. Maria de la Paz	S. Luis Potosi	505
Tlaxiungo	Puebla	000
Zonela huacan (gold)	Vera Cruz	01
Zona Min de Pinos	Guanajuato	5

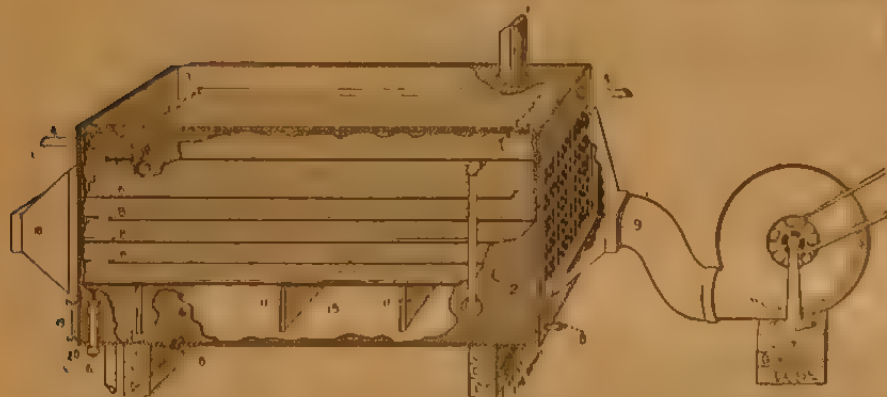
Note—The above Mexican stocks are figured
on the basis of Mexican silver

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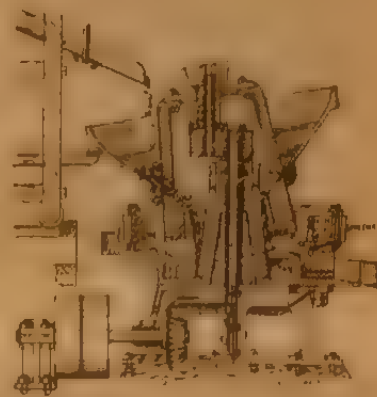
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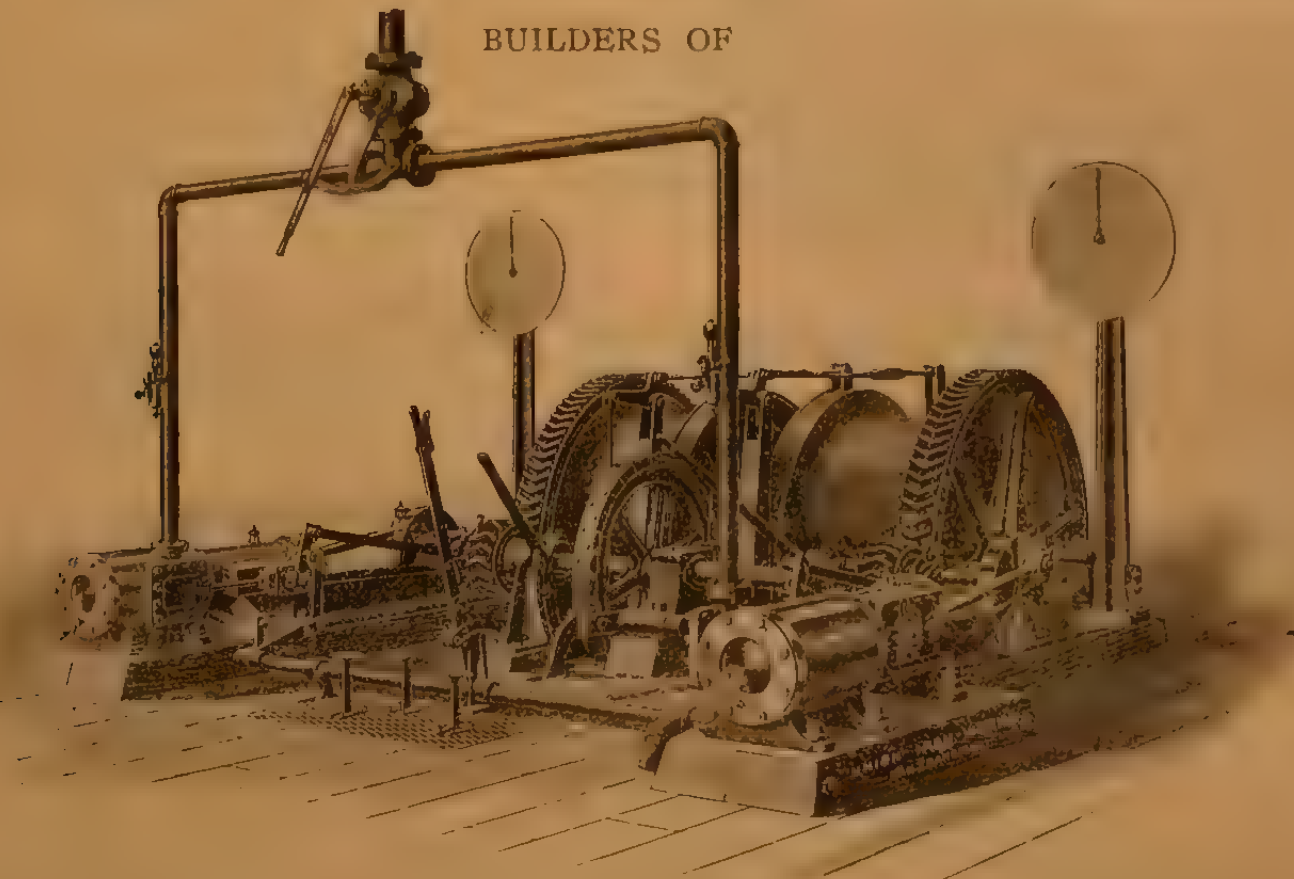
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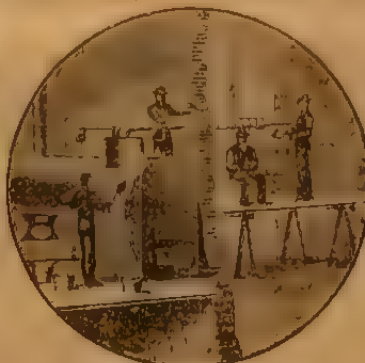
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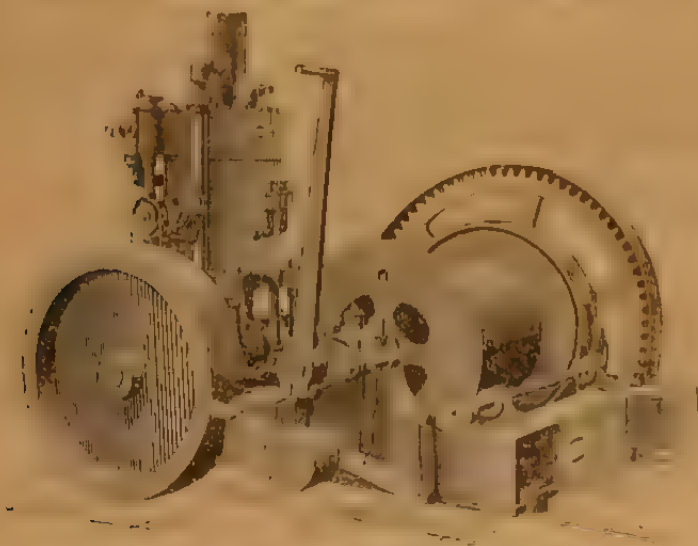
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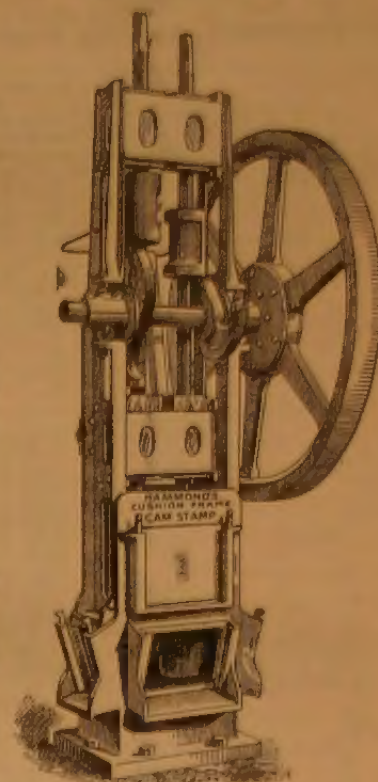
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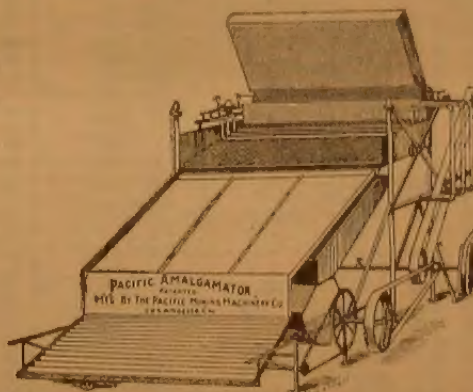
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Guanajuato, Mex.	El Paso	10.00	11.50	13.50		
	Pueblo	13.50	15.00	17.00		
	Denver	15.00	16.50	18.50		
	Kansas City	15.50	17.00	19.00		
Ortiz, "	El Paso	9.50	11.00	13.00		
	Pueblo	12.50	14.00	16.00		
	Denver	14.00	15.50	17.50		
	Kansas City	14.50	16.00	18.00		
Torres, "	El Paso	9.00	10.50	12.50		
	Pueblo	11.50	13.00	15.00		
	Denver	13.00	14.50	16.50		
	Kansas City	13.50	15.00	17.00		
Hermosillo, "	El Paso	8.50	10.00	12.00		
	Pueblo	10.00	11.50	13.50		
	Denver	11.50	13.00	15.00		
	Kansas City	12.00	13.50	15.50		
Pesqueira, "	El Paso	8.00	9.50	11.50		
	Pueblo	10.00	11.50	13.50		
	Denver	11.50	13.00	15.00		
	Kansas City	12.00	13.50	15.00		
Querobabi, "	El Paso	7.00	8.50	10.50		
	Pueblo	10.00	11.50	13.50		
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Santa Ana, "	El Paso	6.50	8.00	10.00		
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	Denver	11.00	12.50	14.50		
	Kansas City	11.50	13.00	15.00		
Magdalena, "	El Paso	6.00	7.50	9.50		
	Pueblo	9.00	10.50	12.50		
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Nogales, A. T.	El Paso	5.00	6.50	8.50	15.20	16.60
	Pueblo	8.00	9.50	11.50	17.20	18.60
	Denver	9.50	11.00	13.00	18.20	19.60
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Calabasas, "	El Paso	4.50	6.00	8.00	15.20	16.40
	Pueblo	7.50	9.00	11.00	17.20	18.40
	Denver	9.00	10.50	12.50	18.20	19.40
	Kansas City	9.50	11.00	13.00	18.25	21.30
Sanford, "	El Paso	4.00	5.50	7.50	15.00	16.20
	Pueblo	7.00	8.50	10.50	17.00	18.20
	Denver	8.50	10.00	12.00	18.00	19.20
	Kansas City	9.00	10.50	12.50	18.15	21.20
Crittenden, "	El Paso	3.50	5.00	7.00	14.80	16.00
	Pueblo	6.50	8.00	10.00	16.80	18.00
	Denver	8.00	9.50	11.50	17.80	19.00
	Kansas City	8.50	10.00	12.00	18.00	20.95
Fairbank, "	El Paso	3.00	4.50	6.50	14.60	15.80
	Pueblo	6.00	7.50	9.50	16.60	17.80
	Denver	7.50	9.00	11.00	17.60	18.80
	Kansas City	8.00	9.50	11.50	17.75	20.40
Tucson, "	El Paso	2.50	4.00	6.00	14.40	15.60
	Pueblo	5.50	7.00	9.00	16.40	17.60
	Denver	7.00	8.50	10.50	17.40	18.60
	Kansas City	7.50	9.00	11.00	17.55	20.35
Benson, "	El Paso	2.00	3.50	5.50	14.20	15.40
	Pueblo	5.00	6.50	8.50	16.20	17.40
	Denver	6.50	8.00	10.00	17.20	18.40
	Kansas City	7.00	8.50	10.50	17.35	20.15
Steins Pass, N.M.	El Paso	1.50	3.00	5.00	14.00	15.20
	Pueblo	4.50	6.00	8.00	16.00	17.20
	Denver	6.00	7.50	9.50	17.00	18.20
	Kansas City	6.50	8.00	10.00	17.15	19.95
Lordburg, "	El Paso	1.00	2.50	4.50	13.80	15.00
	Pueblo	4.00	5.50	7.50	15.80	17.00
	Denver	5.50	7.00	9.00	16.80	18.00
	Kansas City	6.00	7.50	9.50	16.95	19.75
Silver City, "	El Paso	0.50	2.00	4.00	13.60	14.80
	Pueblo	3.50	5.00	7.00	15.60	16.80
	Denver	5.00	6.50	8.50	16.60	17.80
	Kansas City	5.50	7.00	9.00	16.75	19.55
Hudson, "	El Paso	0.00	1.50	3.50	13.40	14.60
	Pueblo	3.00	4.50	6.50	15.40	16.60
	Denver	4.50	6.00	8.00	16.40	17.60
	Kansas City	5.00	6.50	8.50	16.55	19.35
Deming, "	El Paso	0.00	1.00	3.00	13.20	14.40
	Pueblo	2.50	4.00	6.00	15.20	16.40
	Denver	4.00	5.50	7.50	16.20	17.40
	Kansas City	4.50	6.00	8.00	16.35	19.15
Florida and Lake Valley, "	El Paso	0.00	0.50	2.50	13.00	14.20
	Pueblo	2.00	3.50	5.50	15.00	16.20
	Denver	3.50	5.00	7.00	16.00	17.20
	Kansas City	4.00	5.50	7.50	16.15	18.95
Nutt, "	El Paso	0.00	0.00	2.00	12.80	14.00
	Pueblo	1.50	3.00	5.00	14.80	16.00
	Denver	3.00	4.50	6.50	15.80	17.00
	Kansas City	3.50	5.00	7.00	15.95	18.75
El Paso, "	El Paso	0.00	0.00	1.50	12.60	13.80
	Pueblo	1.00	2.50	4.50	14.60	15.80
	Denver	2.50	4.00	6.00	15.60	16.80
	Kansas City	3.00	4.50	6.50	15.75	18.55
Las Cruces, "	El Paso	0.00	0.00	1.00	12.40	13.60
	Pueblo	0.50	2.00	4.00	14.40	15.60
	Denver	2.00	3.50	5.50	15.40	16.60
	Kansas City	2.50	4.00	6.00	15.55	18.35
Rincon, "	El Paso	0.00	0.00	0.50	12.20	13.40
	Pueblo	0.00	1.50	3.50	14.20	15.40
	Denver	1.50	3.00	5.00	15.20	16.40
	Kansas City	2.00	3.50	5.50	15.35	18.15

FROM

TO

A. T. & S. F. R. R.

ATLANTIC & PACIFIC RAILROAD

FROM		TO	Car Loads in dollars and per ton of 2,000 lbs.				
			Ore Concentrator.			Lead Bullion, valuation not to exceed \$100 per ton.	Base Metal, Copper Matte, Bar and Black Copper, valuation not to exceed \$500 per ton.
			Valuation not to exceed \$50 per ton.	Valuation not to exceed \$100 per ton.	Valuation not to exceed \$500 per ton.		
Engle..... N. M.	Crocker..... "	El Paso.....	2.20	2.60	3.60		5.00
		Pueblo.....	6.50	7.00	8.00	10.20	
		Denver.....	7.00	7.50	8.50	11.40	
Lava..... "	San Marcial..... "	Kansas City.....	7.50	8.00	11.00	14.20	
		El Paso.....	2.20	2.60	3.60		5.40
		Pueblo.....	6.20	6.70	7.70	10.00	10.80
San Marcial..... "	Carthage..... "	Denver.....	6.70	7.20	8.20	11.20	11.80
		Kansas City.....	7.20	7.70	10.70	13.80	15.00
		El Paso.....	2.40	2.80	4.50		5.60
Carthage..... "	San Antonio..... "	Pueblo.....	6.20	6.70	7.70	9.80	10.60
		Denver.....	6.70	7.20	10.20	10.80	11.80
		Kansas City.....	7.20	7.70	10.70	13.40	15.00
San Antonio..... "	Magdalena..... "	El Paso.....	2.60	3.20	4.70		6.00
		Pueblo.....	6.20	6.70	7.70	9.80	10.60
		Denver.....	6.70	7.20	10.20	10.80	11.80
Magdalena..... "	Socorro..... "	Kansas City.....	7.20	7.70	10.70	13.00	15.40
		El Paso.....	2.40	2.80	4.70		5.80
		Pueblo.....	6.20	6.70	7.70	9.80	10.40
Socorro..... "	Albuquerque..... "	Denver.....	6.70	7.20	10.20	10.80	11.60
		Kansas City.....	7.20	7.70	10.70	12.60	15.20
		El Paso.....	2.80	3.60	5.10		6.20
Albuquerque..... "	Bernalillo..... "	Pueblo.....	6.00	6.50	8.50	10.60	10.60
		Denver.....	6.50	7.00	10.00	11.80	11.80
		Kansas City.....	7.00	7.50	10.50	13.00	15.60
Bernalillo..... "	Wallace..... "	El Paso.....	2.80	3.20	4.70		6.00
		Pueblo.....	6.00	6.50	8.50	9.40	10.20
		Denver.....	6.50	7.00	10.00	10.80	11.80
Wallace..... "	Los Cerillos..... "	Kansas City.....	7.00	7.50	10.50	12.00	15.00
		El Paso.....	3.00	4.00	5.50		7.00
		Pueblo.....	4.50	5.00	7.00	8.40	9.00
Los Cerillos..... "	Flagstaff, A. T.	Denver.....	5.00	5.50	8.50	10.20	10.80
		Kansas City.....	5.50	6.00	10.00	12.00	14.00
		El Paso.....	3.00	4.00	5.50		7.00
Flagstaff, A. T.	Peach Spgs Hackberry..... "	Pueblo.....	4.50	5.00	7.00	8.40	9.00
		Denver.....	5.00	5.50	8.50	10.20	10.80
		Kansas City.....	5.50	6.00	10.00	12.00	14.00
Peach Spgs Hackberry..... "	Kingman..... "	El Paso.....	3.20	4.20	5.70		7.20
		Pueblo.....	4.20	4.70	7.70	8.20	8.80
		Denver.....	4.70	5.20	9.20	10.00	10.80
Kingman..... "	Yucca..... "	Kansas City.....	5.20	5.70	9.20	12.00	14.00
		El Paso.....	3.40	4.40	5.90		7.40
		Pueblo.....	4.20	4.70	7.70	7.80	8.60
Yucca..... "	Needles..... Cal.	Denver.....	4.70	5.20	9.20	8.80	10.40
		Kansas City.....	5.20	5.70	9.70	12.00	14.00
		El Paso.....	3.60	4.60	6.10		7.60
Needles..... Cal.	Fenner..... "	Pueblo.....	4.00	4.50	7.50	7.60	8.40
		Denver.....	4.50	5.00	8.00	8.40	9.00
		Kansas City.....	5.00	5.50	8.50	12.00	13.50
Fenner..... "	Bagdad..... "	El Paso.....	6.50	7.00	10.00		
		Pueblo.....	7.50	8.00	12.50	14.00	14.00
		Denver.....	8.00	8.50	13.00	14.00	14.00
Bagdad..... "	Daggett..... "	Kansas City.....	8.50	9.00	13.00	14.00	14.00
		El Paso.....	7.50	8.00	11.25		
		Pueblo.....	8.00	8.50	13.75	18.20	18.48
Daggett..... "	Baratow..... "	Denver.....	8.50	9.00	15.20	18.20	18.48
		Kansas City.....	10.00	11.00	15.20	18.20	18.48
		El Paso.....	7.50	8.00	11.25		
Baratow..... "	Kramer..... "	Pueblo.....	8.00	8.50	13.75	18.60	20.40
		Denver.....	8.50	9.00	15.80	18.60	20.40
		Kansas City.....	10.00	11.50	15.80	18.60	20.40
Kramer..... "	Mojave..... "	El Paso.....	7.50	8.00	11.75		
		Pueblo.....	8.50	10.00	14.25	19.00	21.25
		Denver.....	10.00	11.50	15.80	19.00	22.00
Mojave..... "	Baratow..... "	Kansas City.....	10.50	12.00	15.80	19.00	22.00
		El Paso.....	7.75	8.25	12.00		
		Pueblo.....	8.50	10.00	14.50	19.40	22.00
Baratow..... "	Fenner..... "	Denver.....	10.00	11.50	16.20	19.40	22.60
		Kansas City.....	10.50	12.00	16.20	19.40	22.60
		El Paso.....	8.25	8.75	12.75		
Fenner..... "	Bagdad..... "	Pueblo.....	9.00	10.50	15.25	20.00	22.50
		Denver.....	10.50	12.00	16.60	20.00	23.20
		Kansas City.....	11.00	12.50	16.60	20.00	23.20
Bagdad..... "	Daggett..... "	El Paso.....	8.50	10.00	13.75		
		Pueblo.....	9.50	11.00	16.50	20.70	23.50
		Denver.....	11.00	12.50	17.20	20.70	24.00
Daggett..... "	Baratow..... "	Kansas City.....	11.50	13.00	17.20	20.70	24.00
		El Paso.....	9.00	10.50	14.50		
		Pueblo.....	10.00	11.50	17.00	21.60	24.75
Baratow..... "	Kramer..... "	Denver.....	11.50	13.00	18.00	21.60	25.00
		Kansas City.....	12.00	13.50	18.00	21.60	25.00
		El Paso.....	9.00	10.50	14.75		
Kramer..... "	Mojave..... "	Pueblo.....	10.00	11.50	17.25	21.60	25.00
		Denver.....	11.50	13.00	18.00	21.60	25.00
		Kansas City.....	12.00	13.50	18.00	21.60	25.00
Mojave..... "	Baratow..... "	El Paso.....	8.50	11.00	15.21		
		Pueblo.....	10.50	12.00	17.71	22.60	25.00
		Denver.....	12.00	13.50	18.37	22.60	28.20
Baratow..... "	Kramer..... "	Kansas City.....	12.50	14.00	18.37	22.60	28.20
		El Paso.....	10.00	11.50	15.75		
		Pueblo.....	11.00	12.50	18.25	22.60	25.00
Kramer..... "	Mojave..... "	Denver.....	12.50	14.00	18.80	22.60	28.20
		Kansas City.....	13.00	14.50	18.80	22.60	28.20

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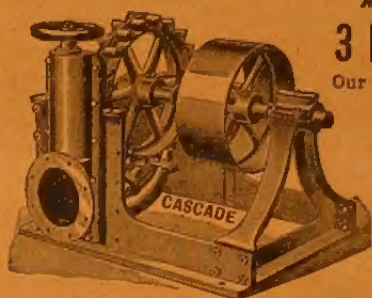
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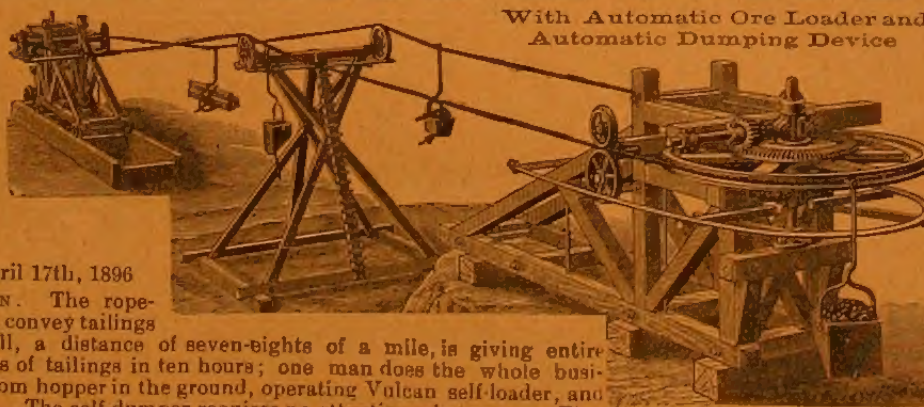
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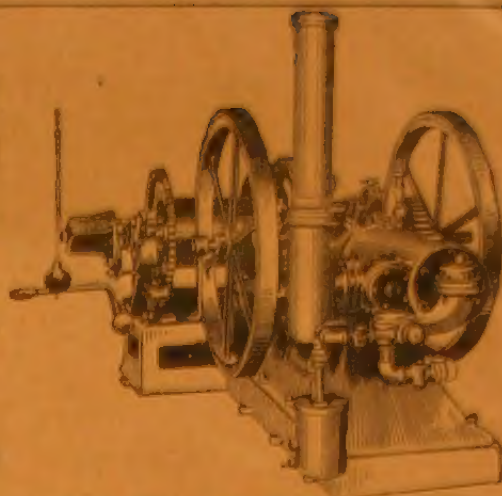
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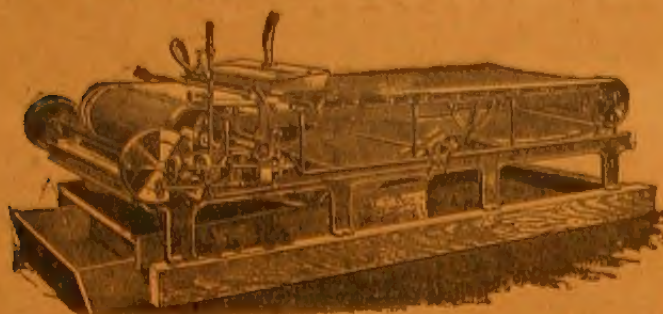
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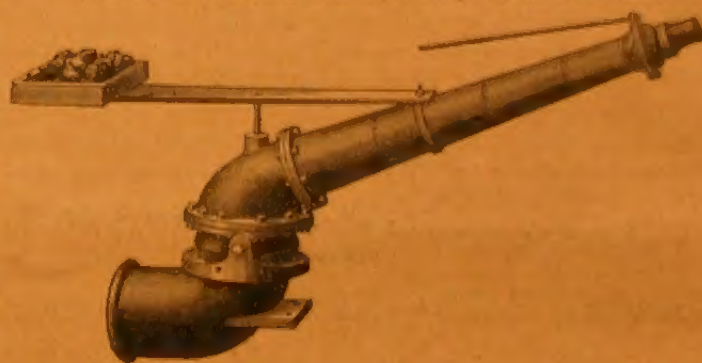
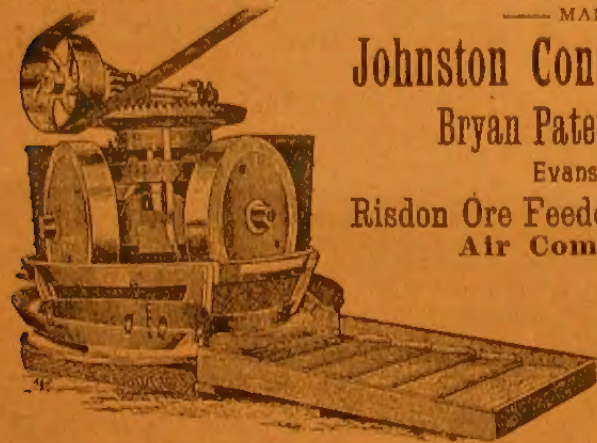
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